REGINA HALU

# THE DEFINITION OF LEARNING STRATEGIES IN TARGET LANGUAGE STUDIES

Dissertação apresentada como requisito parcial para a obtenção do Grau de Mestre, Curso de Pós-Graduação em Letras, (concentração em Língua Inglesa), Setor de Ciências Humanas, Letras e Artes, Universidade Federal do Paraná.

Orientador: Prof. Dr. José Erasmo Gruginski.

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# *PARECER*

Defesa de dissertação da Mestranda *REGINA CÉLIA HALU* para obtenção do título de **Mestre em Letras.**

Os abaixo assinados John Schmitz, José Erasmo Gruginski e Elena Godoi, argüiram, nesta data, o candidato, o qual apresentou a dissertação:

**THE DEFINITION OF LEARNING STRATEGIES IN TARGET LANGUAGE STUDIES**

Procedida a argüição segundo o protocolo aprovado pelo Colegiado do Curso, a Banca é de parecer que a candidata está apta ao título de ***Mestre em Letras***, tendo merecido os conceitos abaixo:

| Banca | Assinatura | Conceito |
|---|---|---|
| John Schmitz | ..... | A |
| José Erasmo Gruginski | ..... | A |
| Elena Godoi | ..... | A |

Curitiba, 19 de dezembro de 1997.

COORDENAÇÃO DO CURSO DE PÓS-GRADUAÇÃO EM LETRAS
UFPR
CCPGL

*Prof.ª Odete Pereira da Silva Menon*
***COORDENADORA***

To my grandparents,
João e Paulina Halu.
(*in memoriam*)

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## LIST OF ABBREVIATIONS

FL - FOREIGN LANGUAGE
L2 - SECOND LANGUAGE
L1 - FIRST LANGUAGE
LSs - LEARNING STRATEGIES
LLSs - LANGUAGE LEARNING STRATEGIES
TL - TARGET LANGUAGE
CSs - COMMUNICATION STRATEGIES
PSs - PRODUCTION STRATEGIES
RSs - RECEPTION STRATEGIES

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## RESUMO

Este trabalho concentra-se sobre o uso do conceito de *estratégias de aprendizagem* na área de estudos sobre a aquisição de língua estrangeira/segunda língua (LE/L2). Seu objetivo é, primeiramente, apresentar uma revisão crítica de como as estratégias de aprendizagem têm sido apresentadas e definidas na literatura e analisar sua(s) característica(s) específica(s). Em segundo lugar, o trabalho verifica como o conceito é colocado dentro de modelos de aquisição de LE/L2. Embora o termo *estratégias de aprendizagem de língua* seja atualmente usado com freqüência, ainda é difícil definir o conceito. Na verdade, existem muitas definições gerais, seguidas de listas de possíveis características, mas poucas tentativas de oferecer uma base teórica sólida para o que se entende por estratég*ias de aprendizagem de língua*. Normalmente, associa-se o conceito a estudos cognitivos da aquisição de LE/L2 e as características mais freqüentemente citadas para defini-las são a consciência e o objetivo de aprendizagem. O objetivo de aprendizagem no uso das estratégias de aprendizagem faz a distinção entre estas e as estratégias de comunicação, ainda que seja difícil mensurar a motivação de um aluno ao usar uma língua estrangeira e ainda que o uso de qualquer dos tipos de estratégias possa trazer resultados inesperados. A consciência no uso das estratégias aparece como a característica básica que as distinguem de todos os outros processos de aprendizagem. Analisando as tentativas feitas para explicar o papel das estratégias de aprendizagem de língua dentro de um modelo teórico de aquisição de língua, verificou-se que a maior dificuldade encontra-se justamente em lidar com o aspecto da consciência. Este aspecto também determina o tipo de metodologia de pesquisa que pode ser usado (a coleta de relatos verbais sobre os processos mentais do aluno) e o tipo de informação que pode ser obtido (informação sobre os processos que se encontram *disponíveis* para serem relatados verbalmente). Assim sendo, este trabalho levou à conclusão de que existem três aspectos chaves para a definição de estratégias de aprendizagem de língua: o aspecto da aprendizagem, o aspecto estratégico ou consciente e a disponibilidade para relatos verbais. Ele termina por sugerir que há necessidade de desenvolver futuras pesquisas sobre a relação entre o uso de diferentes tipos de relatos verbais e outros métodos de pesquisa e a delimitação do conjunto de processos conhecidos como estratégias de aprendizagem de língua.

## ABSTRACT

This study focuses on the use of the concept *learning strategy* (LS) in the area of foreign/second language (FL/L2) studies. Its aim is firstly to present a critical review of how it has been presented and defined in the literature and to analyse its distinguishing characteristic(s); secondly, it discusses how the concept fits into theoretical models of FL/L2 learning. Although the term *language learning strategy* (LLS) is now frequently used, it is still difficult to define the concept. In fact, there are many general definitions, followed by lists of possible characteristics, but very few attempts to offer a solid theoretical basis for what is understood by *language learning strategies*. The concept is usually connected with the cognitive approach to FL/L2 learning and has consciousness and the learning purpose as its most frequently cited distinguishing characteristics. The learning purpose in the use of LSs differentiates them from *communicative strategies*, although it is difficult to measure a learner's motivation to use a foreign language and although the use of either kind of strategies may bring unexpected results. Consciousness in the use of LSs comes out as the basic characteristic that distinguishes them from other learning processes. By analysing the attempts made to explain the role of LLS in a theoretical language learning model, it was found that the main difficulty lies in dealing with this conscious aspect. This aspect also determines the kind of research methodology that can be used (the collection of verbal reports about the learners's mental processes) and the kind of data that can be obtained (information about those processes that are *available* for verbal reports). Thus, this study led to the conclusion that there are three key aspects for the definition of LLSs: the *learning* aspect, the *strategic* or *conscious* aspect and the *availability for verbal report*. It suggests that further research should be carried out concerning the relationship between the use of different kinds of verbal reports and other research methods and the delimitation of the set of processes known as language learning strategies.

**CONTENTS**

# 1 INTRODUCTION

## 1.1 The context of this study

In the pendulum like movement that seems to characterise the way advances are made in many fields of knowledge, it is observed that the area of foreign/second language (FL/L2) teaching has changed from a grammatically conscious way of teaching to an emphasis on the unconscious learning processes (with, for example, the Total Physical Response method, the Silent Way, and Suggestopedia) and back to an emphasis on conscious learning processes. In this movement, it can be said that the pendulum has also changed its axis: the practical and theoretical concerns have moved from a focus on what *teachers* can do to teach a language to a focus on what *learners* do to learn it.

These changes in the area of FL/L2 studies coincided with the emergence of a renewed interest in the study of human thinking and the role of consciousness. This is similarly part of a pendulum like movement from early introspective studies in psychology in the late 19th century with Wilhelm Wundt to Skinner's approach to the study of human behaviour based on observable and quantifiable data (SKINNER 1938) and up to the recent interdisciplinary approach of the cognitive sciences. Since the mid-1950s philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology have been sharing knowledge and tools to study the processes of the mind. The processes involved in the acquisition of new skills, in particular, received special attention and new theories were put forward (SCHNEIDER AND SHIFFRIN 1977; ANDERSON 1982, 1983; CLARK 1989).

The cognitive advances have made a great impact on language acquisition studies. From the cognitive point of view, language can be seen as another complex human skill whose acquisition involves the processing, storage and structuring of new information in the mind. In FL/L2 studies, when integrated with other perspectives on language acquisition (e.g. with more specifically linguistic questions and with social considerations)[1], this new approach has the effect of giving more

[1] As MCLAUGHLIN and ZEMBLIDGE (1992:72-73) state, 'the cognitive approach is a fruitful line of investigation to pursue phenomena of second-language learning'. However, they also make it clear that this approach, like any other, will not answer all the questions. They believe that it becomes more

emphasis to the learner's role in the language learning process. The focus is on the learners' minds, that is, on what they consciously or unconsciously do to learn a language.

Among the different kinds of processes available for the learner, there is a specific set of processes known as *learning strategies*. In the field of FL/L2 studies, learning strategies have become central to the discussion about what learners do to learn a language and to control their learning (RUBIN 1975, BIALYSTOK 1981, WENDEN AND RUBIN 1987, O'MALLEY AND CHAMOT 1989, OXFORD 1990). As ELLIS (1994:529) observes, there has been an 'explosion of activity' in this area in recent years, with *strategy* appearing as a key term in the cognitive approach to second language acquisition.

### 1.2 The problem of this study

The problem is that strategy is not an easy term to define. Despite being now widely used, it remains rather elusive to definitions. ELLIS (1994:295) acknowledges the difficulty and refers to strategy, in broad terms, as 'some form of activity, mental or behavioural, that may occur at a specific stage in the overall process of learning and communicating'. SCHMITZ (1994), in the article 'The term strategy: a useful concept for applied linguistics?', calls attention to the variety of conceptions that can be covered by the term within and outside linguistics. Although both Ellis and Schmitz, among other researchers, believe that the studies on strategies are promising, they point out the need for a more solid theoretical basis for the development of research on language learning strategies. ELLIS (1994:540) observes that definitions are usually presented *ad hoc*, that is, to suit this or that experiment.

Thus, the 'explosion' in the area of language learning strategies seems to have occurred in spite of the difficulties in the definition and distinctions of basic terms. More practical and immediate interests seem to have been the fuel for this explosion, especially in relation to the possibilities of strategy instruction in second or

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useful and comprehensive if complemented by linguistic research, which would enable it to address specific linguistic considerations. As an example, they argue that 'understanding the process of restructuring is a central concern of contemporary cognitive psychology, but a more thorough understanding of restructuring in second-language acquisition requires the analysis of linguistic data' and they mention the work on restructuring in decreolization and late second-language learning carried out by SCHUMANN (1978).

foreign language learning. Many researchers have already attempted to explore the potential of LSs in the classroom and designed instructional models and material (ELLIS and SINCLAIR 1989, BROWN 1989, OXFORD 1990, CHAMOT and O'MALLEY 1994). In any case, when carrying out research on learning strategies or presenting models of instruction in learning strategies, basic choices and definitions have to be made, even if tentatively. Besides that, it is over 30 years since the publication of the pioneering research on language learning strategies (CARTON 1966, 1971; STERN 1975; NAIMAN et al. 1978). There has been time for the development of some research tradition and for the proposal of definitions for the main terms and concepts involved.

### 1.3 The aims of this study

The present analysis is based on recent research into language learning strategies in the area of foreign/second language studies and on the attempts made to give them a theoretical basis. The focus is the definition(s) of language learning strategies in FL/L2 studies. The aim is firstly to make a critical review of how language learning strategies have been presented and defined; secondly, to develop a deeper theoretical discussion concentrating on the question of how these strategies fit into theoretical models of FL/L2 language learning and on the role of consciousness in the distinction between learning processes and learning strategies; finally, to analyse whether the studies of language learning strategies, and therefore their definition, may be affected by the research methodology utilised.

### 1.4 The structure

This work is organised in five chapters. Chapter I introduces the context of this study and presents its aims and structure. In chapter II there is a critical review of the literature. It presents the basic distinctions involving strategies as part of a language learning process and analyses a sample of representative definitions of *learning strategies* as well as lists of their main characteristics. This chapter points out the need to analyse in more depth the role of consciousness as a key aspect to

distinguish learning processes from learning strategies. Chapter 3 focuses on the uses of the term *consciousness* in FL/L2 studies as a previous step to the analysis of how the term is used in connection with *learning strategies*. This analysis is carried out in chapter IV, with a focus on the attempts made to theoretically ground *learning strategies* in FL/L2 language learning models. Chapter V presents the conclusions of this study as well as a brief discussion of questions raised herein which deserve further attention. The Appendix contains the classifications of learning strategies that were mentioned in the chapters.

# 2 LEARNING STRATEGIES

This chapter focuses on the use of the term *learning strategies* (LSs) in the area of target language (TL) learning[2]. It is intended to analyse their distinctive features, those that would be essential to separate them from learning processes in general and from other types of strategies.

As a first step, LSs are situated within the broader discussion about the differences between learning, communicative and social/affective strategies. Next, after briefly reviewing the development of the studies on LSs in the TL area, an analysis is made of the definitions that have been proposed for LSs. The terms in which they are defined prove to be inadequate or insufficiently clear. Thus, as a complementary resource, lists of the main characteristics of LSs, inductively prepared by researchers, are compared and discussed in connection with the definitions.

There is an aspect, that of consciousness, which regularly appears in the studies, definitions, and lists of characteristics focusing on LSs. It is central for a definition of learning strategies, but it is also the centre of a great controversy concerning its usefulness in a TL learning model. In light of this situation, new questions are raised about LSs and their place within an appropriate learning model.

## 2.1 Strategies: common distinctions

As OXFORD (1990:7-8) pointed out, the term 'strategy' was taken from its original war context (meaning *generalship* or *the art of war*) and used as a metaphor, in many different fields, for 'a plan, step, or conscious action toward achievement of an objective'. In the cognitive approach to second/foreign language acquisition[3],

[2] Following COHEN (1990:2) and OXFORD (1990:6), for the purposes of this work the generic term *target language* will be used to cover both *second language* and *foreign language*. Although it will be usually unnecessary to use this distinction in the present discussion, it should be kept in mind that there are important differences between these two terms, with the former, for example, implying more direct exposure to the language being learned and more immediate social and communicative functions in the community where it is being learned.

[3] I will not follow strictly the distinction between 'acquisition' and 'learning' as proposed by KRASHEN (1977). Sometimes the terms will be used interchangeably. However, part of the discussion in this work is going to focus on the question of conscious awareness and automaticity in language processes.

'strategy' became a key term, being found in phrases such as 'learning strategies', 'language processing strategies' and 'communication strategies'. Research into strategies has steadily increased in the last two decades and more recently instructional models have been developed (ELLIS and SINCLAIR 1989, O'MALLEY and CHAMOT 1990, OXFORD 1990). Nevertheless, however useful and productive the concept of strategies in the area of foreign/second language acquisition has proved to be, there is still little consensus about its definition and few attempts have been made to give it any appropriate theoretical underpinning. This criticism has repeatedly appeared in recent publications in which past and present research in strategies and TL acquisition are reviewed (ELLIS 1994, SCHMITZ 1994, MCDONOUGH 1995).

ELLIS (1994:295) notices the difficulty in 'tying down' the concept and starts his discussion with the general working notion of 'some form of activity, mental or behavioural, that may occur at a specific stage in the overall process of learning and communicating'. The discussion about the definition of the term begins to take a clearer shape when an initial distinction between production, communication and learning strategies is drawn. One of the first researchers to try to clarify the differences between these terms was TARONE (1980, 1981). Her main interest was in the definition of communication strategies (CSs), but she tried to make a contrast with learning strategies (LSs) and production/reception strategies (PSs/RSs). She proposed three criteria for defining CSs, the first one establishing the main difference in relation to LSs:

> (1) a speaker desire to communicate meaning x to a listener;
> (2) the speaker believes the linguistic or sociolinguistic structure desired to communicate meaning x is unavailable, or is not shared with the listener; thus
> (3) the speaker chooses to
> (a) avoid - not attempt to communicate meaning x - or
> (b) attempt alternate means to communicate meaning x. The speaker stops trying
> alternatives when it seems clear to the speaker that there is shared meaning.
> ( TARONE 1981:288)

The definition given by TARONE (1980:419) to learning strategy is that of 'an attempt to develop linguistic and sociolinguistic competence in the target language', that is, what motivates a learner to use a certain strategy is the desire to learn rather

than to communicate. A production strategy is ‘an attempt to use one’s linguistic system efficiently and clearly, with a minimum of effort’, and a communication strategy is ‘a mutual attempt of two interlocutors to agree on a meaning in situations where requisite meaning structures do not seem to be shared’. These two types would be related to language use, that is, they would serve the purpose of facilitating communication. These distinctions have served as a point of reference since then and are mentioned, for instance, by O’MALLEY and CHAMOT (1990:43) who refer to production strategies (e.g. discourse planning, rehearsal) as those ‘used to accomplish communication goals’ and to communication strategies as ‘an adaptation to the failure to realise a language production goal’ (e.g. topic avoidance, language switch). TARONE (1981:291) also refers to perception strategies, which would form a pair with production strategies, being used for the efficient interpretation of utterances (e.g. paying attention to word endings and stressed syllables).

It can be seen that there is a tendency to consider communication strategies as being only related to oral communication, which is especially apparent in the definitions proposed. TARONE (1981:288) used the term ‘speaker’, FAERCH and KASPER (1983:25) link them to the planning phase of speech production, BIALYSTOK (1990:75-82) also refers to ‘speakers’ and ‘speech production’. The definitions proposed result from research whose main focus is in fact on oral production, even though the term is supposed to cover those ‘cognitive processes involved in the use of L2 in reception and production’ (ELLIS 1994:396; *emphasis added*). The initial classification and definitions proposed by TARONE (1977), for instance, are a result of an analysis of transcripts of learners’ attempts to make an oral description of a drawing and an illustration in their target language (English) and their native language. In most cases, experiments involve oral description of pictures, story telling and oral interviews. OXFORD (1990:243) is one of the few researchers to notice that the term *communication strategies* is usually used in a too restricted sense, as applying only to oral production and then making it possible to erroneously imply that communication does not occur when the other three skills are used.

What is important to notice about all these distinctions is that they are based on learners’ motivation. This entails at least three problems: (a) it is not possible to measure motivation; (b) a learner can make use of a strategy motivated in different degrees by both a desire to learn and to communicate; (c) even if a strategy is used

with a communicative purpose, it may trigger unconscious learning processes (TARONE 1981:290).

Anyway, when it becomes necessary to make reference to communication strategies as opposed to learning strategies, researchers usually offer a restricting definition of the former as those strategies that are employed by a TL user when participating in a conversation. They must rely on the distinction based on the learner's main purpose for the use of the strategies (learning or communication), while conceding that it cannot always be easily applied. At least, this seems to be a practical solution for research purposes, and is the position taken, for example, by RUBIN (1987:26) who similarly warns that '[t]he relationship of communication strategies to learning strategies is not always so clear since in the process of clarifying meaning, learners may uncover new information which they then store in their language system'.

It is exactly because of this reasoning that what also happens is that we find communication strategies (sometimes referred to as compensatory or compensation strategies, as in OXFORD 1990) included in classifications of learning strategies (ELLIS and SINCLAIR 1989, OXFORD 1990). It could be argued, as was said before, that communication strategies may eventually lead learners to the acquisition of the correct forms of the target language. Taking into account the present stage of research on communication strategies, this is still a rather debatable statement. In a recent evaluation of the research in this area, ELLIS (1994:402-3) pointed out, firstly, the limited scope of the research, which normally focuses on lexical problems, and, secondly, two critical research gaps, which are the study of the developmental nature of communication strategies in second language production and of the relationship between the use of CSs and acquisition.

Another kind of strategy facing similar problems is the social/affective. This group sometimes appears in typologies of learning strategies (ELLIS and SINCLAIR 1989, OXFORD 1990, O'MALLEY and CHAMOT 1990) and is sometimes considered independently (WENDEN and RUBIN 1987). In both cases, although some kind of definition of the category is offered, very little is mentioned about research in the area. Thus, for example, O'MALLEY and CHAMOT (1990:45), who consider them as learning strategies, explain briefly that they 'represent a broad grouping that involves either interaction with another person or ideational control over affect'. As examples (in a listening comprehension activity), they mention co-operating with peers to check

notes and get feedback and lowering anxiety through self-control. The same examples can also be found in OXFORD (1990), who treats social and affective strategies separately, but both as indirect strategies for general management of learning. In WENDEN and RUBIN (1987), the distinction between learning, communication, and social strategies is maintained, but all of them are presented as contributing directly or indirectly to the language learning process. Social strategies are defined as 'those activities learners engage in which afford them opportunities to be exposed to and practice their knowledge', but which 'in themselves do not contribute to learning because they merely put the student in an environment where practice is possible' (27). In any case, there is a tendency to recognise the indirect relevance of social/affective strategies for language learning.

## 2.2 Learning strategies: definitions

The area on which in fact most research has focused is learning strategies. In the last two decades they have been attracting an increasing amount of attention, even though the first studies date back to 1966 with the publication of CARTON's research on what he called the *method* of inferencing in foreign language study. In 1971, he published another article on the topic where he refers to three ways of making inferences: using previously acquired knowledge of the target language, using L1 knowledge for comparisons (cognates, phonological similarities), and using previous knowledge of the world (CARTON 1971). From this seminal research there followed an initial phase with an emphasis on making inventories of the characteristics of the so-called 'good language learners'[4] and compilations of strategies used by them (RUBIN 1975 and 1981, STERN 1975, WONG-FILLMORE 1979, NAIMAN et al. 1978). Later, researchers aimed at providing comprehensive categories in which to distribute specific strategies (O'MALLEY and CHAMOT 1990, OXFORD 1990, WENDEN 1991).

[4] The expression 'good language learner' refers, broadly speaking, to successful learners. In some of the early studies on learning strategies (e.g., RUBIN 1975), the subjects chosen were self-defined good language learners. It has been a useful and productive concept, but one which has to be taken with some caution in view of the difficulty in defining it (what is good or successful for one learner may be different from what it represents to another). The idea originated from Carroll's suggestion about making biographies of individuals speaking two or more languages in order to get information about the conditions for successful L2 acquisition. (CARROLL 1967:104).

However, most of this work has been developed based on definitions of learning strategies that, in ELLIS' words (1994:533), 'have tended to be *ad hoc* and atheoretical'. There has really been 'an explosion of activity' in the area (SKEHAN 1991:285) and this means not only publication of research, but also books on learning strategies intended for learners and teachers (RUBIN and THOMPSON 1982, STEWNER-MANZANARES et al. 1983) and textbooks on learning strategies and learner training (WENDEN and RUBIN, 1987, OXFORD 1990, O'MALLEY and CHAMOT 1990). What worries researchers like ELLIS (1994) and SCHMITZ (1994) is that, even though this is a very practical and productive area of research, not enough attention is given to its theoretical basis.

Taking *Learning to Learn English* (ELLIS and SINCLAIR 1989) as an example of a book intended for practical use by learners and teachers, one finds an introductory chapter in its *Teacher's Book* containing a theoretical overview of learner training. There is an explanation of most of the key terms used in the book (learner training, learner development, study skills, good language learner) and reference is made to the classification of learning strategies proposed by O'MALLEY et al. (1985), but it does not present an explicit definition of what learning strategies are. In another publication, *Learner Strategies in Language Learning* (WENDEN and RUBIN 1987), more focused on research findings, there is a chapter by RUBIN dealing specifically with the theoretical assumptions underlying learning strategy studies. Its conclusion is symptomatic of the lack of attention to the need for a sounder or deeper theoretical basis for the research being carried out in the area. All that is said about it is that 'the major task which researchers have pursued has been to identify a conceptual framework for learner strategies, based largely on an information processing model of learning' (27), a task which would include identifying specific strategies and building a general typology (which are usually the two main points of theoretical attention). What the conclusion of RUBIN's chapter really stresses is the possibility of instruction in learning strategies (28). The spread of this concern with instruction may be a reflection of one of the most productive types of strategy research carried out in the L2/FL field. From NAIMAN et al. (1978) and RUBIN (1975) to CHAMOT et al. (1988), researchers have been interested in what 'good learners' did that led them to successful learning. Their focus is on 'effective' strategies and there is the attractive idea that what these students did may be taught to other students with results just as successful as theirs.

In 1975, NAIMAN, FRÖLICH and STERN observed that there was no consensus about the definition of learning strategies. Almost a decade later, BIALYSTOK (1983:100) stated again that '[t]here is little consensus in the literature concerning either the definition or the identification of language learning strategies'. In 1987, WENDEN (7) warned about the same difficulty, giving a sample of the variety of denominations given to learning strategies (e.g., "techniques", "potentially conscious plans", "consciously employed operations"). More recently, after discussing some of the uses of the term, MCDONOUGH (1995:6) has reached the same conclusion saying that

> [t]his brief discussion will most likely have given the impression that the concept of psychological strategy is a very difficult one to pin down in a clear fashion that can be accepted by a majority of workers in the field. This impression is quite justified; and yet it does not prevent this undeniably useful notion from continuing to be used both as a programmatic principle, i.e. as a justification for certain kinds of teaching, for example in 'learner training', and as an explanatory principle, for example in studies of communication breakdown and individual differences in learning.

To see up to what point that impression is justified, looking for common ground for the research in this field, we can, as a first step, examine the definitions of LSs that have recently been proposed. Based on a survey of recent publications, a sample of definitions is presented below (table 2.1). Through an initial analysis of this sample, it may be possible to point out some of the problems that make it difficult to establish theoretically what language learning strategies are in fact.

Definition 1 appears in some articles by TARONE (1980,1981) in which the main focus is the discussion of CSs. As we have seen, she manages to establish a contrast based on the user's motivation to resort to any given strategy (for communication or learning purposes). The main problems concerning this contrast have already been pointed out. However, it should still be noticed that in all the definitions given (for CSs, PSs, RSs, LSs), the word 'attempt' is used, as if encompassing all the particular features that are implied in the term 'strategy'. The word is very vague and there is no discussion of how these strategies would be distinguished from the general TL learning processes.

Table 2.1 Definitions of language learning strategies:

1. TARONE 1980:419: 'an attempt to develop linguistic and sociolinguistic competence in the target language'.

2. WEINSTEIN and MAYER 1986:315: 'Learning strategies are the behaviours and thoughts that a learner engages in during learning that are intended to influence the learner's encoding process.'

3. CHAMOT 1987:71: 'Learning strategies are techniques, approaches or deliberate actions that students take in order to facilitate the learning and recall of both linguistic and content area information.'

4. RUBIN 1987:23: 'Learning strategies are strategies which contribute to the development of the language system which the learner constructs and affect learning directly.'

5. OXFORD 1990:8: '... learning strategies are specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferable to new situations.'

6. COHEN 1990:5: 'learning strategies are viewed as learning processes which are consciously selected by the learner.'

7. RICHARDS et al. 1992:355: '...learning strategies ... and communication strategies ... are those conscious and unconscious processes which language learners make use of in learning and using a language.'

(original)

Some of the definitions imply that LSs are effective or productive in themselves. In definition 3, Chamot says that they 'facilitate' the learning process. In definition 4, Oxford makes an enthusiastic apology for LSs. Once more, it may be the influence of the 'good language learner' type of study which, focusing on learners'

effective use of strategies, may obscure the fact that LSs are not effective or ineffective *per se*. There are definitions, such as definitions 2 and 4 in the table, that use more neutral words to define the role of LSs ('to influence', 'to contribute').

Besides this, in definition 2, Weinstein and Mayer's reference to LSs as 'behaviors and thoughts' point to the fact that some LSs are purely mental activities while others are observable behaviour. This can be directly linked with the research methods used to identify and analyse LSs. Because direct observation of learners' performance, usually made in classrooms, proved to bring very few results (RUBIN 1981, NAIMAN et al. 1978, COHEN and Aphek 1981), most research has relied on verbal reports (e.g., interviews, diaries, think aloud tasks) in an attempt to access the mental operations related to strategy use.

This capacity to report on strategy use is directly linked to the debate about the conscious aspect of LSs. CHAMOT and O'MALLEY, using Weinstein and Mayer's definition in *The CALLA Handbook* (1994:60), stress this characteristic. In the article from which definition 3 (CHAMOT 1987) was taken, the awareness condition to characterise LSs is already present (notice the use of the adjective 'deliberate'). It is a study of 'ways in which some good language learners made conscious efforts to learn English more efficiently' (71; *emphasis added*). COHEN (1990:5) adopts a clear position in this debate, viewing the conscious aspect of the selection of LSs as the main distinguishing characteristic between general learning processes and LSs. Other researchers show some uncertainty. OXFORD (1990:9) characterises LSs as being '*often* conscious', but she accepts the idea that strategies can become automatic. She also notices that some learners make instinctive or unconscious use of strategies, whether appropriately or inappropriately (10).

Considering these difficulties, it is not surprising that the definition appearing in a reference work such as the *Longman Dictionary of Language Teaching and Applied Linguistics* (definition 7), in trying to encompass different points of view, ends up with a concept so generic that it does not differentiate LSs from any language learning process.

## 2.3 Learning strategies: tying down

What some researchers have attempted to do as an alternative or complement to insufficient definitions is to list their main characteristics. WENDEN (1987:6-8)

proposed six criteria (table 2.3) and placed the study of learner strategies in second language learning within 'the general area of research on mental processes and structures that constitute the field of cognitive science'. It is the same position taken by ELLIS (1995:295), who considers the term *strategy* one of the 'key terms in a cognitive account of L2 acquisition'. Reviewing the research in the area, he also found it useful to list the main characteristics of LSs (table 2.4). Similarly, OXFORD (1990:9) discusses key features of language learning strategies that she then summarises in a table (table 2.2). In her list, however, it is possible to see that she considers the term *strategy* as being more encompassing than a cognitive framework could allow (*see* item 6).

Most of the work on LSs has placed them within the field of cognitive science. As WENDEN (1987:4) explains, it is a very recent discipline that may include 'everything that goes on in the mind between input and output, i.e. perception, memory, learning, inference, concept formation...'. It has as its basic assumption the idea that human beings are 'processors of information'. However, the encompassing use of this processor metaphor to the field of LSs is not accepted by all researchers. In her criticism of the cognitive approach to LSs, OXFORD (1990) argues in favour of viewing the learner as 'a "whole person" who uses intellectual, social, emotional, and physical resources and is therefore not merely a cognitive/metacognitive information-processing machine' (1992:20). She attempted to offer a more comprehensive classification of language learning strategies in which sets of LS that do not fit the cognitive framework could equally receive attention. Her typology includes affective, social, metacognitive, cognitive, memory-related and compensatory strategies (*see* Appendix). In her 1990 book, however, she does not suggest any alternative or complementary theoretical framework that could be used when referring to LSs. Although clearly based on a thorough review of previous research in the area, she adopts a very practical position, working on her typology and giving detailed explanation and varied examples on how FL/L2 teachers can test and use LSs in their classrooms. The concept of learning strategies is not theoretically grounded, but it is based on practical experiments with TL learners which aimed at finding out and assessing exactly those 'specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to new situations' (OXFORD 1990:8).

Table 2.2. Oxford's list of the characteristics of language learning strategies.

1. Contribute to the main goal, communicative competence.
2. Allow learners to become more self-directed.
3. Expand the role of teachers.
4. Are problem-oriented.
5. Are specific actions taken by the learner.
6. Involve many aspects of the learner, not just the cognitive.
7. Support learning both directly and indirectly.
8. Are not always observable.
9. Are often conscious.
10. Can be taught.
11. Are flexible.
12. Are influenced by a variety of factors.

(OXFORD 1990:9)

Table 2.3. Wenden's six criteria to characterise language learning strategies.

(1) First of all, strategies refer to *specific actions* or *techniques* [... ]. They are not characteristics that describe a learner's general approach, as when language learners are said to be reflective, or risk takers.

(2) Some of these actions will be *observable* (asking a question) *and* others will *not* be *observable* (making a mental comparison).

(3) They are '*problem oriented*'. Learners utilize them to respond to a learning need, or to use a more technical definition from cognitive psychology, "to facilitate the acquisition, storage, retrieval or use of information."

(4) [...] Thus, strategies will be used to refer to language learning behaviors that *contribute directly to learning* - what learners do to control and/or transform incoming knowledge about the language (e.g. guessing from context, outlining a reading); to retrieve and use this knowledge (e.g. practice strategies); *and* to regulate learning (noting if one understands, deciding to pay attention to one's pronunciation). It will also refer to language learning behaviors that *contribute indirectly to learning* - how learners use their limited linguistics repertoire to communicate (e.g. describing or circumlocuting when they do not know a word; using gestures) and what they do to create opportunities to learn and use the language (going to movies, making friends).

(5) Sometimes strategies *may be consciously deployed*. [...] However, it is also possible for learners to develop facility in the use of a strategy. For certain learning problems, strategies *can become automatized* and remain below consciousness or potentially conscious [...] .

(6) Strategies are behaviors that are *amenable to change*. They can be modified, rejected, and unfamiliar ones can be learned. In other words, they are part of our mental software.'

(WENDEN 1987:7-8)

Table 2.4. Ellis's list of the characteristics of language learning strategies.

| |
|---|
| 1 Strategies refer to both general approaches and specific actions or techniques used to learn an L2. |
| 2 Strategies are problem orientated - the learner deploys a strategy to overcome some particular learning problem. |
| 3 Learners are generally aware of the strategies they use and can identify what they consist of if they are asked to pay attention to what they are doing/thinking. |
| 4 Strategies involve linguistic behaviour (such as requesting the name of an object) and non-linguistic (such as pointing to an objet so as to be told its name). |
| 5 Linguistic strategies can be performed in the L1 and in the L2. |
| 6.Some strategies are behavioural while others are mental. Thus some strategies are directly observable, while others are not. |
| 7 In the main, strategies contribute indirectly to learning by providing learners with data about the L2 which they can then process. However, some strategies may also contribute directly (for example, memorization strategies directed at specific lexical items or grammatical rules). |
| 8 Strategy use varies considerably as a result of both the kind of task the learner is engaged in and individual learner preferences. |
| |
| (ELLIS 1994:532-33) |

In a later article (NYIKOS and OXFORD 1993:11), she seems to revise her position, accepting contributions from information-processing theory and referring to LSs as 'steps taken by learners to facilitate acquisition, storage, retrieval and use of information'. But she also points to the literature on the social psychology of language as a resource for interpreting research findings on LSs. It is an approach that takes factors such as motivations and learners' beliefs into account and which has been gradually receiving more attention. Still, the article has a practical orientation, aiming at analysing groupings of strategies and their use by learners, but not drawing extensively on any theoretical framework.

Oxford's argument is, in any case, correct and reflects the expansion of the field covered by the term *learning strategy*. When O'MALLEY and CHAMOT (1990:44) attempt to focus on LSs using a cognitive theory, they make it clear that they are going to deal with a subset of LSs that is concerned with conceptual processes, which are more suitable for this type of approach. Their focus is on what is classified as metacognitive and cognitive LSs, which represent a significant part of what are considered as learning strategies. This is not always made explicit in the debates about LSs.

The general definitions of LSs, which are the focus of this study, are based on cognitive concepts and the more 'technical' ones use terms normally associated with cognitive models (the phrase 'storage, retrieval and use of information' appears, for

instance, in BROWN et al. 1983 and RUBIN 1987). This may lead to the idea that all the specific categories of LSs are best explained by a cognitive approach, to the exclusion of all others. As NYIKOS and OXFORD (1993) tried to show, the study of metacognitive and cognitive strategies may be appropriately linked to a cognitive approach, while social/affective strategies may be best understood if also linked to social/psychological studies.

The three lists of characteristics under study were aimed at LSs in general, and they should all show ways through which LSs could be set apart from general learning processes. The vague idea of LSs as 'some form of activity, mental or behavioural, that may occur at a specific stage in the overall process of learning and communicating' can only serve as a starting point (ELLIS 1994:295). If examined comparatively, the lists may help to specify the general terms of the definition above and clarify what is implicit in the other definitions previously mentioned (e.g., WEINSTEIN and MAYER 1986, CHAMOT 1987, OXFORD 1990, COHEN 1990).

One of the first aspects to be discussed is whether LSs should be taken as a learner's general approach or as specific actions/techniques. ELLIS's list is based on the studies analysed in his review, which included STERN's position (1975; 1983). What Stern treats as *strategies* is more related to general plans for actions or general attitudes or styles (e.g. a positive, active approach to learning, willingness to practise and use the language). His use of the word *technique* corresponds to what other researchers refer to as *strategy*. It is because of the inclusion of Stern's point of view that this question in Ellis's list differs from what is found in Oxford's and Wenden's lists. When OXFORD (1990:11) and WENDEN (1987:7) use the term *action*, the intention is to distinguish strategies from the learner's general characteristics (e.g. aptitude, motivation) and approaches (e.g. risk taking), which influence the use of strategies. In any case, to discuss LSs in terms of general approaches or specific actions does not point to a particular characteristic that would differentiate LSs from the more general learning processes.

A second aspect to appear in the lists is the fact just mentioned that the use of LSs is influenced by several factors (table 2.3, item 8; table 2.2, item 12). ELLIS (1990) shows it more clearly in a summary reproduced in fig.2.2. The point is, again, that the factors that influence the use of LSs are a necessary part of an explanation of the functioning of LSs within the overall learning process, but they are not specific

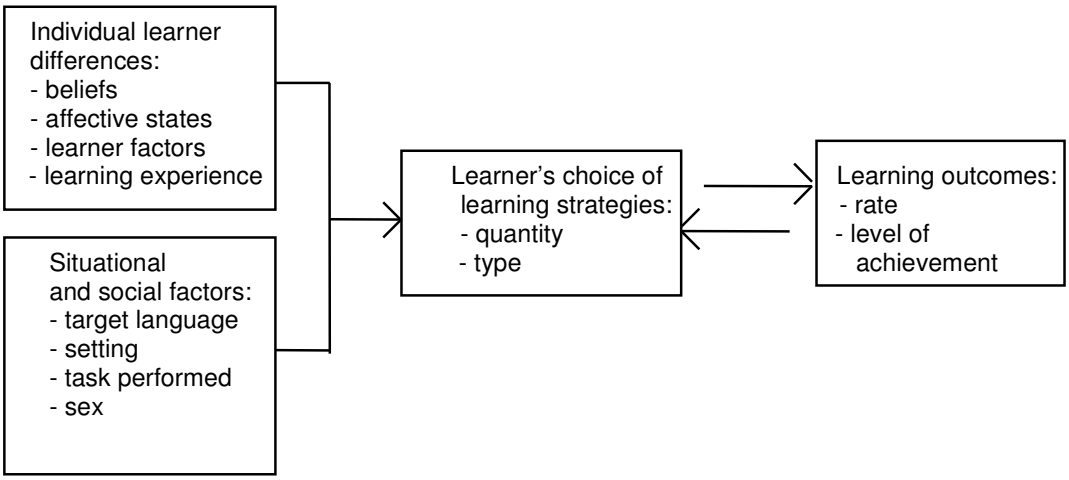
characteristics (factors such as beliefs, affective states and sex do not affect only the use of LSs).

A third aspect present in the lists refers to two other terms, *direct* and *indirect*, that are normally used in classifications of LSs. ELLIS (1994) links them to the possible effects of strategies on interlanguage development, briefly commenting on controversial points of view. He mentions two contrasting positions as examples: RUBIN (1987), who would argue that LSs have a direct effect on the development of the language system, and SELIGER (1984), who believes that the use of LSs would provide deeper processes with data (ELLIS 1994:532). This refers back to the first section of this chapter, where the distinction between communicative and learning strategies was discussed, and to Rubin's definition of LSs in table 2.1 (def. 4). RUBIN (1987:25-26) argues that communication and social strategies would have a more indirect effect on the learning process, while conceding that their use may trigger processes which will result in storage of new information in the language system. She does not mention any research findings to confirm either of the possibilities.

In OXFORD's list (1990) the two terms are also used, but there the term *direct* has to do with the learning and use of a new language (memory, cognitive and compensation strategies would be direct strategies). Strategies that do not necessarily involve explicit linguistic processes are considered indirect (thus, including metacognitive, affective, and social strategies). Connected with this opposition, there is Ellis' observation that some types of behaviour classified as LSs are non-linguistic (table 2.4, item 4). What should be noticed is that the terms direct and indirect are used to make distinctions within the whole group of LSs, and that, with this classificatory purpose, they may be used with different meanings.

One last aspect that all three lists recognise is that some strategies occur only at a mental level, while others reach behavioural expression, which is in accordance with Weinstein and Mayer's definition (def. 2 in table 2.1) previously discussed. The main point is that some strategies are easily observable while others are not, which clearly brings implications in the accessibility for research. Nevertheless, this observation may well apply to other cognitive processes, and does not lead to a specific characterisation of LSs as opposed to other learning processes.

Fig. 2.1 The relationship between individual learner differences, situational factors, learning strategies, and learning outcomes




(ELLIS 1990:530)

Since none of the aspects discussed above are adequate to differentiate LSs from other learning processes, we are left with the debate about the conscious/unconscious (subconscious) nature of strategies. If the question was just one of adherence to the original metaphor, the assertion that strategies necessarily require a degree of consciousness to be considered strategic should not be open to dispute and would be set as their distinguishing characteristic. However, as was seen in the previous section, this is not exactly the case.

The discussion about the conscious aspect of LSs is also linked to researchers' interest in directly teaching appropriate sets of LSs that can contribute positively to the learning process. This point appears in the lists of characteristics (table 2.3, item 6; table 2.2, item 10). OXFORD (1990:12), for example, suggests that, in the case of learners who already employ LSs 'unthinkingly', strategy assessment and training may help them to become aware of what they are doing and evaluate the effectiveness of their strategies.

The conclusion that can be drawn is that *consciousness* is probably a key term in the definition or characterisation of LSs. The problem is that it is one of the most controversial topics in the cognitive sciences and, more specifically, in TL learning. If the previous two paragraphs are screened, we are going to find the term *consciousness* linked to other terms such as *intention*, *awareness*, *attention*, *automatization*, showing that it may be used with different meanings. This

observation can lead researchers to take opposite views about the relevance of the conscious/unconscious issue in TL learning. In a debate about this topic, SCHMIDT (1990:131) argued that the distinction is useful 'because it ties together such related concepts as attention, short term memory, control vs. automatic processing, and serial vs. parallel processing', while MCLAUGHLIN (1990:627) counterargued saying that 'these terms are too laden with surplus meaning and too difficult to define empirically to be useful theoretically'. Thus, the former would say that consciousness is of relevance for a model of TL learning, and the latter would favour distinctions (such as that between controlled and automatic processing) that are neutral in relation to consciousness.

In view of this discussion and considering that consciousness together with a learning facilitation goal are the terms in which LSs can be defined, it is now necessary to consider the following questions/points:

1. analyse the sense(s) with which consciousness is being employed in the literature about LSs;
2. see if there is an alternative concept for consciousness that could also be valid for defining/characterising LSs;
3. check what attempts have been made to place LSs within a TL learning model capable of sustaining their characterisation, that is, that LSs differ from what is normally called learning processes on the basis of their conscious nature (or alternative concept).

## 2.4 Summary

In this chapter it was possible to conclude that:

a. the discussion about strategies firstly involves the delineation of broad distinctions between learning, communicative and social/affective strategies. The main distinction between learning and communicative strategies is based on the learner's intention or motivation when using them. It is recognised that it is not possible to determine exactly to what degree a TL speaker is using the language with a communicative or learning intention, and that CSs may lead to learning just as LSs may result in successful communication;

b. it is similarly acknowledged that social/affective strategies have an indirect effect on the language learning process, which is why, when proposing classifications, researchers disagree about whether to include them in the category of learning strategies or not;

c. in spite of this disagreement, recent research has resulted in improvements concerning comprehensive classifications, with general categories organising previous compilations of LSs (*see* Appendix);

d. however, the definitions of LSs found in the literature tend to present an 'ad hoc' and 'atheoretical' quality, resulting from a conflict between the interest in the immediate use of LSs for instructional purposes and the difficulties in finding an appropriate theoretical framework for them;

e. the comparison of different definitions, such as those in Table 2.1, shows the inadequacy of the use of some terms ('attempts', 'facilitate') and the disagreement around others ('conscious/unconscious'). If an attempt is made to take all definitions into consideration in order to establish a general, common ground, the result is such a broad statement, as in definition 7, that it is not possible to distinguish LSs from other learning processes;

f. the lists of characteristics suggested by various researchers (Oxford, Ellis, Wenden were the ones mentioned in this chapter), as an alternative or complement to the definitions, serve to give an idea of what is involved in the discussion of LSs (specific or general actions, diversity of factors influencing the use of LSs, direct and indirect types of LSs, mental or behavioural processing level);

g. the comparative analysis of a representative sample of these lists revealed that the only characteristic that could serve as a distinction from general learning processes was the conscious aspect involved in the use of LSs. The conscious/unconscious question in TL learning is very controversial, with researchers taking opposite views about its validity.

Because of this last conclusion, the next chapter will focus on the different uses of the term *consciousness* in TL studies, as a preparation for the more specific discussion involving *consciousness* and *language learning strategies*.

# 3 CONSCIOUSNESS AND TARGET LANGUAGE STUDIES

The previous chapter pointed at *consciousness* as a key term to define learning strategies. However, before analysing how this term is used in the literature on LSs, it is necessary to have a broader picture of the discussion involving *consciousness* and TL studies. Thus, the main focus in this chapter is the discussion about the various senses in which the term is used by TL researchers. By reviewing the debate between SCHMIDT (1990) and MCLAUGHLIN (1990), the different positions concerning the validity of the use of the term in TL learning models and the difficulties involved in this task are presented. The conclusion calls attention to the need of definitional clarity for an adequate use of either the term *consciousness* or any alternative option.

## 3.1 Introduction

To say that consciousness together with a learning facilitation goal are the terms in which LSs could be defined may sound quite obvious but, as the discussion in the previous chapter has shown, it is somewhat controversial.

Firstly, when stating that LSs are a learner's 'attempt to develop linguistic and sociolinguistic competence in the target language' (TARONE 1980:419), one should accept that part of the definition depends on the *learner's motivation*. The contrast usually made between LSs and communication strategies is based on whether the learner is mainly aiming at learning a TL or taking part in a communicative activity. As has been seen, it is possible to use either term on condition that some limitations, such as the impossibility of reliably measuring motivation (*see* TARONE 1981:290), are accepted. In practical terms, it is also possible to partially counterbalance this drawback by focusing on typical learning situations in controlled conditions.

Then, with reference to *consciousness*, it is true to say that the term and its correlates (awareness, automatization, attention, intention) are used or discussed almost everywhere in the TL literature focusing on LSs. Few researchers in the area of LSs dispense with the conscious aspect involved in the use of strategies (e.g.,

BIALYSTOK 1983). On the other hand, there are equally few researchers who would claim that without its conscious aspect a strategy is not a strategy (RABINOWITZ and CHI 1987, COHEN 1990). Most of those who point to the element of consciousness in LS use do so with some uncertainty. In the lists of characteristics of LSs analysed in the previous chapter (OXFORD 1990, WENDEN 1987, ELLIS 1994), it is said that LSs '*may be*' or are '*often*' consciously used or that learners are '*generally*' aware of their use of LSs. In spite of this uncertainty, consciousness is the only aspect that has been pervasively employed in the literature about LSs in TL learning analysed so far that offers the potential to distinguish LSs from other learning processes. It is necessary to understand how the term consciousness (or equivalents) is used in LS research and theory. As LS studies are part of the larger field of TL studies, it is useful firstly to see how the term *consciousness* has appeared or has been discussed in the latter.

The debate about the role of consciousness in the process of learning a target language has divided researchers' opinions. An early and well-known debate concerning the topic is that between Krashen and McLaughlin. KRASHEN claimed that every learner has an 'acquired system' and a 'learned system' (1977), acquisition being a subconscious process that takes place when the learner is using language for communication (or in a non-instructional, informal environment), while learning is a conscious process focused on understanding and memorising rules. The result, according to Krashen, is two completely separate knowledge compartments (corresponding to the distinction between explicit and implicit knowledge), so that users could know language by 'feel' or use the more limited knowledge by 'rule'. Krashen also argued that an L2/FL is first 'acquired', in a process similar to that which happens with L1, with conscious 'learning' serving to monitor the output of acquired knowledge. MCLAUGHLIN (1978) counterargued with an example from his own experience and pointed out the problem:

> When I "feel" that something is wrong with *Ich habe nicht das Kind gesehen*, I also know that there is a rule about the placement of negatives. Similarly, while I have to have recourse to the rule to be sure that *Ich habe es ihm gegeben* is correct, I also have a feel that *Ich habe ihm es gegeben* is wrong. At least in my own retrospection, it is unclear whether I am working on the basis of "rule" or "feel". (McLaughlin, 1978, pp.317-318)
>
> Krashen, of course, would explain this by saying that in the first case I had unconsciously (or subconsciously) "acquired" the rule and in the second

> I had consciously "learned" it. In fact, Krashen said as much in his reply to my critique of the Monitor Model. He argued (Krashen, 1979), "McLaughlin's observations about himself, on the other hand, seem clear to me if not to him" (p.152). But this was exactly my point - that two or more people can disagree about whether one and the same experience is based on rule or feel. How are such questions to be resolved? This is an important question for a theory such as Krashen's, where the ultimate test of whether a process involves conscious *learning* or unconscious *acquisition* is whether the learner is working on the basis of "rule" or "feel" (McLaughlin, 1978). (MCLAUGHLIN 1990:619-20)

MCLAUGHLIN (1990) concluded, in other words, that if it is all a question of opinion and adequate definitions are not provided for the terms 'conscious' and 'subconscious', there is no way of testing Krashen's hypothesis and the theory lacks validity.

A more recent debate involved MCLAUGHLIN (1990) and SCHMIDT (1990). In arguing for the importance of conscious processes in L2 learning, Schmidt, as even McLaughlin recognised, made a thorough revision of the uses of the conscious/unconscious contrast in the L2 field. McLaughlin, in turn, reviewed other important debates about consciousness while arguing for abandoning the conscious/unconscious distinction. In the next two sections, their arguments and conclusions are reviewed before the discussion is focused specifically on the LS literature.

## 3.2 Consciousness

In his article 'The role of consciousness in second language learning', SCHMIDT (1990:131) distinguishes three main senses of the term *consciousness*: consciousness as *awareness*, consciousness as *intention*, and consciousness as *knowledge*.

When the term is equated with *awareness*, it is also possible to distinguish different levels of awareness: *perception*, *noticing*, and *understanding*. Concerning *perception*, Schmidt notes that it does not have to be conscious and that it may occur subliminally. To explain the difference between *perception* and *noticing*, there is the following illustration:

> When reading, for example, we are normally aware of (notice) the content of what we are reading, rather than the syntactic peculiarities of the writer's style, the style of the type in which the text is set, music playing on a radio in the next room, or background noise outside a window. However, we still perceive these competing stimuli and may pay attention to them if we choose. (SCHMIDT 1990:132)

*Noticing* is what is normally meant when *awareness* is mentioned. It implies availability for verbal report, respecting certain conditions:

> The lack of a verbal report cannot be taken as evidence of failure to notice unless the report is gathered concurrently or immediately following the experience. There are also conscious experiences that are inherently difficult to describe. We may notice that someone has a regional accent without being able to describe it phonetically [...]. When problems of memory and metalanguage can be avoided, verbal reports can be used to both verify and falsify claims concerning the role of noticing in cognition. (SCHMIDT 1990:132)

Finally, it is also possible to associate *awareness* with *understanding*, taking it as the next step after noticing. Awareness would then also cover the reflection on what is noticed, its analysis and comparison with a view to getting at its significance. According to Schmidt, problem solving processes and metacognitive activities would belong to this level.

The second term linked to *consciousness* in Schmidt's article is *intention*. He points out that when expressions like 'conscious efforts, attempts, and strategies' are employed, they are often stressing 'the volitional, deliberate nature of the action'. The problem with intention is that it is usually thought of as 'active intent', but intentions can actually be either conscious or unconscious.

For Schmidt, the third common association, *consciousness* as *knowledge*, is clearly a wrong idea: we are not necessarily conscious of everything we know. In fact, when discussing language and consciousness, researchers quite often use the contrast between conscious and unconscious knowledge (as in the discussion about explicit and implicit knowledge). The problem is that these two ambiguous terms,

consciousness and knowledge, are used differently by different authors, which leads Schmidt to agree with WHITE (1982) about the lack of conceptual clarity of the contrast.

Table 3.1 Summary of Schmidt's discussion of the various senses of consciousness

| | consciousness | unconsciousness | other observations |
|---|---|---|---|
| **awareness/perception** | + | + (subliminal) | 'we often become aware of things we do not intend to notice' |
| **awareness/noticing** | + | - | usually implies availability for verbal report |
| **awareness/understanding** | + | - | implies further processing (thinking, e.g., reflection, analysis, comparison) |
| **intention/volition/ deliberation** | + (active) | + (passive) | |
| **knowledge** | + | + | |

(original)

Finally, Schmidt observes that there are attempts to entirely avoid the discussion about consciousness. However, he argues that the alternative terms are equally ambiguous. There is the example of the controlled/automatic contrast:

> *Automatic* may refer to tasks executed without awareness, actions initiated without intent, the way in which attention may be drawn automatically to something, or tasks performed without interfering with other tasks (Norman and Shallice 1986). The first three of these meanings correspond to similar ambiguities of the term *unconscious*. (SCHMIDT 1990:150)

He concludes that the discussion about consciousness in L2 learning actually reflects a series of questions:

(1) whether or not the learner is *aware* of learning something (unconscious means that the learner is not aware of having learnt anything);

(2) whether the learner *notices* that something is being learnt (unconscious learning corresponding to *subliminal learning*);

(3) whether learning requires *intentional effort* (in order to notice something learners should consciously pay *attention* to it);
(4) whether learners have *understanding* and *insight* (unconscious induction of principles and rules corresponding to *implicit learning*);
(5) whether learning involves *intentions at a more global level*, such as following a *general deliberate plan* about how to study and other *intentional* learning strategies (unconscious learning being 'an unintended by-product of communicative interaction', which still may involve noticing and understanding);
(6) whether learners *are able to say* what they appear to know (unconscious knowledge corresponding to knowledge that cannot be accessed for *introspective report*) (SCHMIDT 1990:134-35).

In the remainder of his article he argues that learning a second language necessarily involves *awareness/noticing* (there is not enough evidence to prove the contrary) and disagrees with the view that most L2 learning is unconscious. The possibility of subliminal learning was rejected since while some experiments only demonstrated the possibility of subliminal *perception* (CECI and HOWE, 1982; DIXON 1971, 1981; KAHNEMAN and TREISMAN, 1984), others showed that subliminal processing only occurs with familiar stimuli (ERICSSON and SIMON 1984; UNDERWOOD 1976, 1982). He accepts the possibility of incidental learning (learning without consciously attempting to learn), especially when task demands made the processing of relevant features of the input necessary. His conclusion is that, in any case, 'there is no reason to accept the null hypothesis that awareness does not affect second language learning, that understanding is epiphenomenal to learning, or that *most* second language learning is implicit' (SCHMIDT 1990:149).

### 3.3 The case against consciousness

In his article, SCHMIDT (1990) wants to show the importance of the discussion about consciousness in second language theory, pointing out that the role of unconsciousness has been exaggerated. However, he believes that L2 learning can be profitably discussed in terms of the contributions made by both conscious and unconscious processes. It is to carry out this discussion that he first examines the different meanings and associations that can apply to consciousness (summarised above). Even though his article exposes the difficulties faced when using the

conscious/unconscious contrast, Schmidt does not see why it should be dropped in favour of other terms since (as mentioned above) they would equally face definitional problems.

Not everybody agrees with this position. Counterarguing Schmidt's opinion about the usefulness of the distinction, MCLAUGHLIN (1990) says that a theoretical term should not be respected simply on the basis of its use in 'an impressive body of research', but on its power of clarification. The problem with the term conscious and unconscious is exactly that 'they are too laden with surplus meaning and too difficult to define empirically to be useful theoretically'. He observes that the fact that they are linked to or imply so many concepts (such as awareness, understanding, attention) can be a sign that they have been transformed into umbrella terms. Thus, instead of discussing about consciousness as x or y, the more specific terms x or y should be defined and used. McLaughlin lists the contrasts mentioned by Schmidt and some others that appear in the literature of cognitive psychology (table 3.2), and shows that at least some of them have already been examined in detail.

Table 3.2 Contrasts Underlying Various Uses of the Terms *Conscious* and *Unconscious*

| *Conscious* | *Unconscious* |
|---|---|
| Learning with awareness | Learning without awareness |
| Noticing | Not noticing |
| Understanding and insight | No understanding and insight |
| Intention to learn | Incidental learning |
| Intention to use metacognitive strategies | No such intention |
| Ability to report what is known | No such ability |
| Explicit knowledge | Implicit knowledge |
| Focal attention | Peripheral attention |
| Short-term memory | Long-term memory |
| Controlled processing | Automatic processing |
| Serial processing | Parallel processing |

(MCLAUGHLIN 1990:628)

His argument is that the discussions that hang on the terms *conscious* and *unconscious* do not lead to any reliable conclusion. According to him, the contrast between explicit and implicit knowledge/learning, for instance, has been much discussed, but since such discussions have hung on the explanatory power of the

terms *conscious* and *unconscious*, they have got nowhere. It is interesting to notice that this criticism about consciousness is similar to the point that Schmidt accepts in relation to consciousness and knowledge being used together (*see* section 3.2 above). Even the same contrast, explicit versus implicit knowledge, is mentioned as an example of the difficulties that are found:

> ... the explicit/implicit contrast surely represents a continuum (Bialystok and Bouchard Ryan 1985; Karmiloff-Smith 1986). Whatever point on the continuum is considered to differentiate implicit from explicit knowledge will largely determine the extent to which second language knowledge is said to be conscious or unconscious, but a careful reading of the second language literature indicates no consensus on where the line is to be drawn. (SCHMIDT 1990:134)

One example discussed by McLaughlin is the Reber/Dulany debate about whether complex knowledge can be acquired implicitly and used unconsciously to judge the correctness of novel items (REBER 1976, REBER and ALLEN, 1978, DULANY, CARLSON and DEWEY 1984).

In their research, Reber and his colleagues exposed their subjects to a finite-state grammar made up of letter strings and found that they were able to accurately judge the grammaticality of novel strings. However, they found that the subjects were not sufficiently able to explain or justify their judgements. Their conclusion was that 'learning occurs in the absence of explicit code-breaking strategies; our subjects cannot tell us very much about what they know' (REBER and ALLEN, 1978:204).

DULANY et al. (1984) carried out the same experiment and confirmed that the subjects were able to acquire 'knowledge of the rules of grammar by simple observation of exemplary strings to be able to judge the grammaticality of novel strings' (MCLAUGHLIN 1990:622). They used a different procedure to find out if the subjects had conscious access to any set of rules (asking them to underline the part of the item that made it correct and to cross out the part that violated the rule). Their finding was that the subjects had built personal and more limited sets of rules, accessible to consciousness, that correlated with the finite-state grammar. What was under discussion was what is understood by consciousness, as their final comment reveals:

> We often intuitively judge the grammaticality of a sentence or the legality of a move or the propriety of an act without conscious access to the formal syntax of the domain. But let us turn the tables somewhat. It is an interesting possibility that each of those intuitions is one of a set of informal rules of limited scope and perhaps imperfect validity. The intuitions seem quite conscious. We know something that seems right or wrong, even when we don't think of or know the proper rule from a formal system. With intuition reclaimed for consciousness, we would not disagree with Allen and Reber (1980, p.178) that "decisions about the well-formedness of test strings are made largely on an intuitive basis. (DULANY, CARLSON and DEWEY 1984:554)

In a later article (REBER, ALLEN and REGAN 1985), it was recognised that the debate got stuck because the question of defining consciousness was a question of personal prejudice. There was no adequate theory of mind that could serve both parties, and so one group would continue to emphasise the role of consciousness to explain human behaviour, while the other would favour the importance of the role of unconsciousness.

As an alternative to cases like this, McLaughlin defends the view that the *automatic*/*controlled* contrast used in information-processing theories is neutral in relation to the question about consciousness. McLaughlin notes that in some theories (e.g., POSNER and SNYDER 1975) there is indeed an identification of control with consciousness and automaticitiy with unconsciousness. He argues, however, that later theories (e.g., SHIFFRIN and SCHNEIDER 1977) avoid making this association. He recognises that characterising the automatic/controlled distinction is not unproblematic. For MCLAUGHLIN (1990:630), the main point is that each possible characterisation should 'represent an attempt to define empirically the nature of the process involved'.

## 3.4 Conclusions from the debate about consciousness

In the discussion about the validity or usefulness of the conscious/unconscious distinction both positions expressed above have weaknesses. McLaughlin's suggestion that the controlled-automatic distinction is neutral in relation to the conscious/unconscious debate is true for some models (his own, Shiffrin and Schneider's), but not for all the models that use the distinction. Besides that, both

McLaughlin and Schmidt acknowledge that this distinction also faces problems of definition, some of them being very similar to those concerning the conscious/unconscious contrast.

On the other hand, discussions about consciousness, like that developed by Schmidt, usually involve several different senses, and attempts to make the necessary distinctions may make it difficult to achieve clarity. This seems to be the case in one of Schmidt's answers to the questions he raised concerning consciousness in L2 learning. In relation question 2, he says that it is not possible to learn without noticing. Thus, some level of consciousness is already established as necessary for the learning process. Then, in question 3 (the incidental learning question), he asks if a conscious effort or intention is necessary for noticing to take place ('what controls what is noticed? is conscious effort necessary?'). This question seems to involve two senses of *consciousness*. One of them is clearly consciousness as noticing (as mentioned in question 2). For the other sense, though, three terms - intention, effort and attention - are used and it is not possible to know if all of them should be taken as equivalents and to what they refer. If it is already difficult to deal with two senses for the same term, it may be confusing not to have those senses clearly defined. When the question about incidental learning is dealt with in a separate section ('incidental learning x paying attention'), what he actually does is to detail a series of factors that may affect noticing (learners' expectations, word frequency, perceptual salience of forms, learners' skill level, task demands).

Discussing the same question, McLaughlin treats the contrast between intentional and incidental learning in the following terms:

> The operational procedures by which INT [intentional] and INC [incidental] learning are distinguished typically involve the comparison of performance under instructions to learn the relevant material and no instructions to learn this material. Data from research show quantitative differences between instructions and no-instructions groups, but all that can be concluded on the basis of such data is that learning is more difficult under disadvantageous (no-instructions) conditions. The no-instructions procedure does not preclude the possibility of sporadic self-instructions, and consequently intergroup differences are attributable only to the functional relations of a number of parameters of efficient and inefficient INT learning. There is no justification for the implication that two types of learning - defined by different operational antecedents - are being investigated in this research. (MCLAUGHLIN 1965:373, cited in MCLAUGHLIN 1990:628-29)

Avoiding the debate about consciousness and following his empirical approach, McLaughlin looks into the procedures involved in the research to argue that what can actually be verified are different conditions of intentional learning. He also touches on the topic of the intentional use of learning strategies. Accordingly, his criticism is directed at the methods employed in the research about LSs, which would depend on retrospection in order to obtain a verbal report (629).

Schmidt also mentions learning strategies in one of his questions (question 5). As in this question he is considering conscious learning with the possible meaning of 'intentions at a more global level', the term learning strategy is not being taken at the level of specific mental processes. His use of the term would apply to general plans or, at most, to the group of metacognitive strategies, that is, those higher order skills involving planning, monitoring and evaluation of the learning activities.

In fact, in this question, he points out that *unconscious learning* may be mistakenly related to those processes involved in a communicative interaction through which learning results appear as a by-product. The distinction between using the language with a learning purpose and using it with a communicative purpose has to do with the learner's intention. However, the processes in either case may involve noticing and understanding (conscious processes) or not (unconscious processes). As has been seen, learning strategies involve the aspect of the learner's general intention in using a language, but the debate involving consciousness and LSs is at the level of the specific learning processes that a learner uses. Schmidt is correct when pointing out that unintended learning in communicative interactions is not necessarily unconscious, but he does not discuss what happens in learning situations, making just a general reference to LSs.

In this entire debate, it is interesting to notice that when both researchers look at how some concepts are put to use in research, they tend to agree. MCLAUGHLIN (1990:629) notes that the distinction between implicit and explicit knowledge is associated with 'the ability to report on knowledge or on the intent to use particular strategies', while SCHMIDT (1990:133) notes that in L2 research the distinction is normally restricted to 'whether a learner is able to articulate a rule of the language'. That means that it does not make much sense to discuss consciousness using that

distinction when the empirical operations and research data refer to a much more limited ability.

This may point to what the two positions have in common and what their strong points are. Both agree that the terms used in L2 theory should be as clear and unambiguous as possible. The other point, which is more emphasised by McLaughlin, is that theories and the terms used in them must be adequately 'tied to empirical operations and empirical data' (MCLAUGHLIN 1990:631).

## 3.5 Summary

This chapter has concentrated on briefly analysing how the term *consciousness* has been discussed in the field of TL studies. The debate between McLaughlin and Schmidt has served as the basis for this analysis because in fact their debate involves the positions of many other researchers both in TL studies (e.g., Krashen) and in cognitive studies (e.g., Reber, Dulany). Furthermore, the debate shows the two main points of view in TL studies concerning the theoretical usefulness of term *consciousness*. McLaughlin believes it is so loaded with different possible meanings that it has lost its power of clarification; he argues, instead, that other terms, usually associated with consciousness, should be clearly defined. Schmidt, in turn, takes on the task of disentangling the different uses of the term in order to show the importance of conscious processes in second language acquisition. In spite of all the definitional problems involved, he is not in favour of dropping the use of the term consciousness because almost the same problems appear when alternative terms are used (such as McLaughlin's choice of the automatic/controlled distinction). So far, it is *consciousness* that has remained at the centre of the debates, with the supportive or parallel use of alternative terms. Both McLaughlin and Schmidt have definitional clarity as a goal. While McLaughlin's discussion highlights the difficulties involved, Schmidt's manages to point out the most common uses of the term in the area of TL studies.

This first analysis prepared the ground for the following chapter where we are going to focus on how the term *consciousness* (or its equivalents) is used when *language learning strategies* are discussed. Consciousness, as the discussion in the

previous chapter has shown, is the aspect that may establish the difference between LSs and other learning processes.

# 4 CONSCIOUSNESS AND TL LEARNING STRATEGY STUDIES

In this chapter I analyse how the term *consciousness* appears in the literature on LSs in TL learning. After observing the terms that are usually associated with *consciousness*, the specific learning models in which they are used are discussed. Two representative cases are studied in more detail. One is BIALYSTOK's early model of L2 learning (1978) and the other is O'Malley and Chamot's attempt to insert LSs within a cognitive learning model (O'MALLEY and CHAMOT 1990, CHAMOT and O'MALLEY 1994). The latter receives special attention because of the scope of their study, which involves a complex information processing model for the acquisition of cognitive skills (ANDERSON 1980, 1983, 1985). In any case, the aim is to analyse whether LSs are satisfactorily defined within a TL learning model, focusing specially on the role of the term *consciousness* in these definitions. The discussion in the conclusion focuses on the essential aspects that define language learning strategies in the context of TL theory and research.

## 4.1 Consciousness and LSs

The following table contains examples of the most common terms that are equated with consciousness in the literature about LSs in TL learning. Although researchers speak of *conscious*/*deliberate*/*intentional efforts* or *attempts* when discussing LSs (WEINSTEIN and MAYER 1986, O'MALLEY and CHAMOT 1990, OXFORD 1990), as SCHMIDT (1990:133) noted in his article, these terms are usually used when a general and brief definition or explanation of LSs must be given. As has been seen in chapter 1, definitions of this type fall short of providing a clearer idea of what specific aspects and characteristics are involved in the discussion about LSs. In longer explanations that require some reference to a theoretical basis, the notion of consciousness as implying a general intentional attitude on the learner's part is normally replaced by a discussion about or reference to the level of automatization and awareness at which the processes considered as LSs occur.

Table 4.1 Terms usually associated or equated with consciousness

| | **conscious/ness** | **unconscious/ness** |
|---|---|---|
| WENDEN 1987:8 | | automatic |
| O'MALLEY and CHAMOT 1990:80 | aware/ness | |
| CHAMOT and O'MALLEY 1994:58-60 | aware/ness | |
| OXFORD 1990:12 | aware/ness | automatic |
| BIALYSTOK 1978:72 | explicit | implicit/automatic |

(original)

Usually, when reference is made to consciousness as linked to processes of automatization and levels of awareness, only a very general idea of a cognitive theory of learning is given, and sometimes not even that, as is the case with OXFORD (1990, 1992). She does not go much beyond pointing out that what is initially identified as a conscious LS can become automatic, a term that she equates with 'unconscious'. She also comments that it may be 'paradoxical' that some learners make an unconscious use of certain learning processes classified as strategies, and that strategy training would then help make these learners 'aware' of these processes and of whether they are being used appropriately (12).

In Wenden's case, at least some explanation about how information would be processed is presented:

> In very general terms, this means that information comes in through our sense receptors. At this time selected items of information are attended to, identified, and, then, moved into the short-term or working memory. In short-term memory a series of mental operations are applied to this information. Then the changed or modified product is stored in long-term memory to be retrieved when it is needed. The mental operations that encoded incoming information are referred to as processes. The changes brought about by these processes are referred to as organizations of knowledge or knowledge structures. The techniques actually used to manipulate the incoming information and, later, to retrieve what has been stored are referred to as cognitive strategies. (WENDEN 1987:6 ; *emphasis added*)

Wenden does not refer to any particular model in this brief attempt to distinguish learning processes from learning strategies. Actually, she makes it clear that it is not her purpose to discuss how adequately certain theoretical models would answer the various questions she raised concerning the definition or identification of LSs. Instead, she explains that 'a more inductive approach' was taken in the listing of the

six aspects that recurrently appear in the articles that were selected for her book (*see* list 2.3, chapter 2).

Thus, in item 5 of her list she mentions consciousness and tries to make some comments based on references from the cognitive literature. However, she does not claim that LSs are conscious or that LSs are unconscious as would be expected from the inclusion of consciousness as a criterion to define LSs. Furthermore, the references she gives present conflicting views on the debate about consciousness. There is, for example, the assertion that 'it is also possible for learners to develop facility in the use of a strategy', that is, 'strategies *can become automatized* and remain below consciousness or potentially conscious' (1987:8). FAERCH and KASPER (1983) and MCLAUGHLIN et al. (1983) are two of the references given to be confronted with the assertion. In this case, the reader has to compare McLaughlin's model of second language learning, where mention of *consciousness* is purposely avoided and where the topic of LSs is not focused, and Faerch and Kasper's view of communication strategies as being conscious or potentially conscious plans for dealing with a problem while trying to reach a communicative goal. It is difficult to see the point of using this kind of references, but it is easy to observe that while there is a pressing need to show some theoretical basis in LS discussions, these discussions are characterised by a superficiality that always runs the risk of resulting in confusion.

## 4.2 Bialystok's model

A better approach when borrowing concepts or explanations from cognitive theories is to specify the use that is being made of each term, acknowledge their source, and preferably show how those terms fit into a model of L2/FL learning, however limited in scope it may be. One such attempt was an early model outlined by BIALYSTOK (1978), which included a small set of LSs. It did not rely on any specific cognitive theory, but drew on cognitive concepts to propose an account of L2 acquisition. This model has many things in common with Krashen's since both are concerned with the role of formal instruction in L2 development and both use the distinction between implicit and explicit knowledge. In Krashen's model explicit knowledge refers to knowledge consciously available to the learner, while implicit

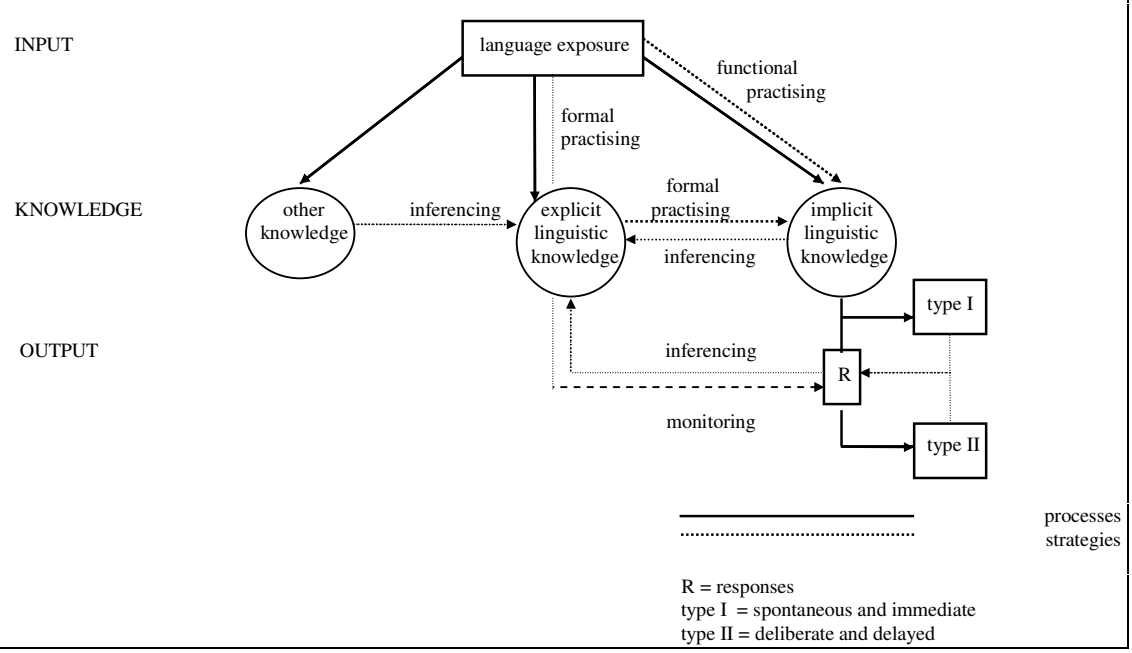
knowledge refers to unconscious knowledge only manifested in actual performance (ELLIS 1995:355-56). Bialystok's model differs from Krashen's especially in that in her model there is an 'interface' or communication between the two kinds of knowledge.

BIALYSTOK (1978:69-71) proposed a model of L2 learning in which *processes* are taken as 'the obligatory relationships that hold between aspects of the model' and *strategies* are 'optional means for exploiting available information to improve competence in a second language'. The use of the terms *obligatory* and *optional* refer, respectively, to what applies to all L2 learners and to what may be used by different learners in different learning situations. Processes, as can be seen in the figure below, are related to the input of information and its storage and the final output. Strategies operate between the different kinds of knowledge stored as well as alongside the input and output processes. She identifies four language learning strategies: inferencing, monitoring, formal practising and informal practising.

The main concern of Bialystok's model is the representation of L2 knowledge and the notions of implicit and explicit knowledge, which are directly linked to Krashen's monitor theory and the acquired and learned types of knowledge. Direct exposure to the target language would mainly develop implicit knowledge: 'a working system containing all the information about the target language necessary for most spontaneous comprehension and production tasks' (BIALYSTOK 1978:72). The strategy of functional practising would refer to a learner's attempts to increase their exposure to language in communicative situations (referring to activities such as going to the cinema and talking with native speakers). Formal exposure to the target language, as in a language classroom, would mainly develop explicit knowledge (containing conscious information about the language, such as simple grammar and pronunciation rules, which the learner would be able to verbalise). Reinforcing this input line, formal practising refers to the conscious study of the target language (e.g., by using grammar books, consulting native speakers). It can be noticed that even though implicit and explicit knowledge are thought of as being separate, there are strategies working as an interface between them. The line for formal practising corresponds to activities such as doing language drills and exercises with the purpose of automatising and transforming explicit knowledge into implicit knowledge. The strategy of inferencing operates on the implicit knowledge to arrive at a conscious understanding (of data, rules) at the explicit knowledge level. New inferred

explicit knowledge can also be obtained through inferencing from the storage of other kinds of knowledge and from the output. The two types of responses distinguished in her model (BIALYSTOK 1978:74) correspond to responses based totally on implicit knowledge (type I - 'spontaneous and immediate') and responses also involving monitoring by the use of explicit knowledge (type II - 'deliberate' and occurring 'after a delay').

Fig. 4.1 BIALYSTOK's model of second language learning (1978:71).




This is in fact an outline of a model. Bialystok schematises knowledge in three separate blocks ('black boxes') and works with general notions of input and output processes. The focus is really on the uses of and the relationship between implicit and explicit linguistic knowledge. All other kinds of knowledge are put together, including knowledge of the world, L1 knowledge and knowledge of other languages. Still in the initial phase of learning strategy studies, she focuses on a limited group of strategies which are used consciously by the learner. In later classifications, inferencing, formal practising and monitoring (in the strict sense of checking linguistic output) would fit the group of cognitive strategies, and functional practising (referring

to the search of opportunities for non-formal practice) would be placed with the group of metacognitive/social strategies.

It is a model heavily dependent on the concept of consciousness. It deals at same time with the idea of explicit/conscious and implicit/unconscious storage of knowledge and the idea of obligatory/unconscious and optional/strategic learning processes. It is also a model that does not go into more specific aspects or phases of the processes involved. Predictably, it faces serious problems. One of which is the extremity of the idea that classroom exposure to a target language is limited to explicit grammar and pronunciation rules or facts about the language and that when left in a 'natural' environment the learner would not use any conscious resources to understand and use the language. As regards consciousness and LSs, if automatization is equated with a transition from a conscious to an unconscious level and consciousness refers to awareness, it makes sense to mention drilling activities as examples of formal practising that transform explicit knowledge into implicit knowledge. However, it is more difficult to establish at what level of consciousness strategies related to functional practising operate: if functional practising refers to getting more exposure to language through interaction with native speakers or cinema-going, for example, then consciousness is at the level of a general intention, but the processes that take place in learner-native speaker or learner-movie interaction can be of any kind. Thus, LSs can be discussed in at least two different senses (awareness and intention), and this within a frame that relies on the contrast between implicit and explicit knowledge and which does not present a theoretical explanation of the mechanisms behind the processes that lead to the formation of those knowledge boxes.

## 4.3 O'Malley and Chamot's proposal

In the literature about LSs in target language acquisition, even though a general reference to the cognitive sciences has usually been made, there have been very few specific attempts to place LSs within a well-developed theoretical model. Actually, in recent years only one fully fledged attempt has been made: O'MALLEY and CHAMOT's work (1990:1) was aimed at providing 'an integrated treatment of learning strategies in second language acquisition that [was] based on theory and

research'. They opted to base their theory and research on 'a cognitive information processing view of human thought and action', which has two fundamental principles:

> (a) that behavior can best be explained by reference to how individuals perceive and interpret their experiences, and (b) that the way in which individuals think and reason has parallels with the manner in which computers process information (Shuell 1986).
> (O'MALLEY and CHAMOT 1990:1)

O'Malley and Chamot chose to work mainly with Anderson's mechanism for representing complex cognitive skills (ANDERSON 1980, 1983, 1985). It should be possible to apply his theory, which was based on information processing models and computer simulation, to any cognitive skill learning process. It is a comprehensive and complex theory which, among the advantages mentioned by O'MALLEY and CHAMOT (1990:19), would cover most of the processes involved in TL acquisition, including strategic processing. Besides this, the discussion about how Anderson's theory applies to TL acquisition counts on the support of a number of practical experiments developed by O'Malley and Chamot, in which a wide range of strategies is surveyed (*see* Appendix for the learning strategies included in their classification).

Their research and their theoretical work were later used as a basis for a project called CALLA (the Cognitive Academic Language Learning Approach). It is an instructional model directed at meeting 'the academic needs of students learning English as a second language in American schools', and which not only focuses on language development and instruction in learning strategies, but also includes content area instruction (CHAMOT and O'MALLEY 1994:4-11). In *The CALLA handbook*, they briefly present their theoretical views and give the following definition of learning:

> ... learning is an active, dynamic, process in which learners select information from their environment, organize the information, relate it to what they already know, retain what they consider to be important, use the information in appropriate contexts, and reflect on the success of their learning efforts. (CHAMOT AND O'MALLEY 1994:13)

CHAMOT AND O'MALLEY (1994:13) argue that the specific processes (including LSs) that constitute this general learning process can be detailed in an information processing framework, which is structured around different types of memory and a sequence of acquisition stages. They explain that a simple framework usually

presents two types of memory (or ways of storing information), long-term and short-term memory. Short-term memory stores small amounts of information for a short period, while long-term memory retains information that has already been integrated with previous knowledge. In some theories, such as Anderson's, reference is made to another type of memory, working memory, which is applied to short-term memory when denoting 'the active use of cognitive procedures with the information being stored' (ANDERSON 1985, cited in O'MALLEY and CHAMOT 1990:17). In relation to the stages in information acquisition, O'Malley and Chamot (1990:17-18) say that it is common to refer to four stages:

(a) selection (selection and transfer of information into working memory),

(b) acquisition (active transfer of information into long-term memory),

(c) construction and (d) integration (the formation of internal connections between ideas in working memory and the use of prior knowledge stored in long-term memory resulting in new or modified organisations of information).

O'MALLEY and CHAMOT (1990:18) explain that '[the] role of learning strategies in this formulation is to make explicit what otherwise may occur without the learner's awareness or [...] inefficiently during early stages of learning'. However, they argue that this basic framework is not adequate 'to explain the role of cognition in second language acquisition'. They aim at addressing 'multiple aspects of language for integrative language use in all four language skill areas' and the different stages of language development. The mechanisms for representing complex cognitive skills that appeared at the time of their research were an advance in relation to that basic framework. Among the options available (rational task analysis by GAGNÉ and PARADISE 1961, interrelated procedural networks by BROWN and BURTON 1978, and production systems by ANDERSON 1980, 1983, 1985), they chose Anderson's theory because of its capacity to integrate prevailing notions of cognitive processing and to cover a wider range of behaviour, its use of the distinction between factual knowledge and procedural skills in memory representation and learning, and its continual updating (O'MALLEY and CHAMOT 1990:19). Concerning LSs, even though the theory does not distinguish learning strategies from other cognitive processes, they believed that it could 'be expanded to incorporate strategic processing as part of the description of how information is learned' (O'MALLEY and CHAMOT 1990:19, 42).

The general definition of LSs used in their work is based on WEINSTEIN and MAYER's (1986:315), which focuses on their learning facilitation goal (by affecting motivational/affective states or cognitive learning processes) and their intentional use by the learner. The initial distinction O'MALLEY and CHAMOT (1990:1) draw between processes and strategies is as general as possible: they explain that '[in] cognitive theory, individuals are said to "process" information, and the thoughts involved in this cognitive activity are referred to as "mental processes." Learning strategies are special ways of processing information that enhance comprehension, learning, or retention of the information'. With these general statements and based on previous compilations and classifications of LSs, they hypothesised that LSs could be treated as a learned skill and be described in Anderson's theory like any other complex skill. They make it clear that, as they are dealing with a cognitive theory, the main focus is going to be on the sets of LSs known as cognitive and metacognitive.

Anderson's theory, as said above, is quite complex and has been continually updated. In this analysis, I will take into consideration only that stage of Anderson's theory that corresponds to references that appear in O'Malley and Chamot's work. In this way I intend to evaluate their interpretation of his theory to account for LSs in L2/FL learning. The first step is, thus, to give a summarised view of Anderson's skill learning theory.

### 4.3.1 Anderson's theory

Anderson's theory is based on Fitts' three-stage model of skill acquisition (FITTS 1964). The first is the *cognitive* stage, where the learner manages to form a rough initial encoding of the skill and which usually involves verbal mediation in the rehearsal of the necessary information. It is followed by the *associative* stage, where the skill performance becomes smoother with the gradual detection and elimination of errors. Verbal mediation becomes less and less necessary. The *autonomous* stage is the last one and is characterised by a continuous refinement of the skill performance. Anderson approves of this general model and proposes to analyse each stage systematically and in more detail (ANDERSON 1983:369).

4.3.1.1 Anderson's stages of skill acquisition and the ACT model

Anderson elaborates on the stages along the following lines. In the first stage the learner receives the instruction and information about the skill. These are encoded as a set of facts to be used by *general interpretative procedures*[5] to generate behaviour (ANDERSON 1983:369-70). He renames the first stage *declarative* because of the frequent use of verbal mediation to rehearse information in working memory during the interpretative procedures. This, however, may be a misleading term because although verbal mediation is frequently present, it is not obligatory. The transitional stage, now called *knowledge compilation*, converts the initial knowledge about the skill into 'a procedural form in which it is directly applied without the intercession of other interpretative procedures (ANDERSON 1983:370). In the final *procedural* stage, besides a continuous *tuning* of the knowledge for its application, there is a process of *speedup*.

These stages are integrated into the frame of his ACT model (Adaptative Control of Thought) in which *production systems* operate. The idea of production systems depends on the distinction between *declarative knowledge* and *procedural knowledge*. Declarative knowledge, or knowledge of what we know about, is represented as propositional networks. Procedural knowledge, or knowledge of what we know how to do, is represented as productions. In order to understand the theory of skill acquisition it is necessary to explain what a production system is and how it operates:

> The ACT production system consists of a set of productions that can operate on facts in the declarative database. Each production has the form of a primitive rule that specifies a contingency, that is, a production specifies when a cognitive act should take place. The production has a condition that specifies the circumstances under which the production can apply and an action which specifies what should be done when the production applies. The sequence of productions that apply in a task correspond to the cognitive steps taken in performing the task.' (ANDERSON 1983:370)

It is important to note that in this system the production itself is the procedural component. This production will only apply if the clauses specified in its condition are matched against information active in working memory (which is part of the system's

[5] These procedures, also called *weak methods*, are assumed as givens in Anderson's model (ANDERSON 1987:206).

declarative component). Production systems have three main features: goal structure, rules of conflict resolution, and the presence of variable slots.

#### 4.3.1.2 The main features of production systems

About the goal structure of production systems, Anderson explains that

> [they] are organized into subroutines, where each subroutine is associated with a goal state that all the productions in the subroutine are trying to achieve. Because the system can have only one goal at any moment in time, productions from only one of these subroutines can apply at any one time. This forces a considerable seriality into the behavior of the system. These goal-seeking productions are hierarchically organized. (ANDERSON 1983:372; *emphasis added*)

In a system, however, it may happen that two or more productions match the same conditions and are competing to be applied. In this case, *rules of conflict resolution* are made necessary. One of the main rules is *refractoriness* or the fact that 'the same production cannot apply to the same data in working memory in the same way'(ANDERSON 1983:372). Another is *specificity*[6]:

> If two productions can apply and the condition of one is more specific than the other, then the more specific production takes precedence. [...] The specificity rule allows exceptions to general rules to apply because these exceptions will have more specific conditions. For instance, suppose we had the following pair of productions:
>
> PA. IF the goal is to generate the plural of man,
> THEN say "MEN."
> PB. IF the goal is to generate the plural of a noun,
> THEN say "noun + s."
>
> The condition of Production PA is more specific than the condition of Production PB and so will apply over the general pluralization rule.
> (ANDERSON 1983:373)

Still another conflict resolution rule is the particular *strength* that each production presents as a result of 'the frequency with which that production has been successfully applied':

[6] In the examples of productions, such as the one given in this explanation, Anderson uses simplified verbal translations of the complex technical syntax used in the actual computer models (ANDERSON 1982:370).

> Productions are indexed by the constants in their conditions. For instance, the Production PA above would be indexed by plural and man. If these concepts are active in working memory, the production will be selected for consideration. In this way ACT can focus its attention on just the subset of productions that may be potentially relevant. Only if a production is selected is a test made to see if its condition is satisfied. (For future reference if a production is selected, it is said to be on the APPLYLIST). A production takes a time T1 to be selected and another time T2 to be tested and to apply. The selection time T1 varies with the production's strength, whereas the application time is a constant over productions. It is further assumed that the time T1 for the production to be selected will randomly vary from selection to selection. The expected time is *a/s* where *s* is the production strength and *a* is a constant. [...]
>
> A production will actually apply if it is selected and it has completed application before a more specific production is selected. This provides the relationship between strength and specificity in the theory. A more specific production will take precedence over a more general production only if its selection time is less than the selection plus application times of the more general production. Because strength reflects frequency of practice, only exception that have some criterion frequency will be able to reliably take precedence over general rules. This corresponds, for instance, to the fact that words with irregular inflections tend to be of relatively high frequency. It is possible for an exception to be of borderline strength so that it sometimes is selected in time to beat out the general rule but sometimes not. (ANDERSON 1982:373)

ANDERSON (1983:373) argues that this would explain, for instance, an interlanguage stage in English when an irregular inflection (past simple tense) is being used with only partial reliability.

The last main feature of production systems are the so-called *variable slots* which can take different values in different situations. One example from a production system to perform an addition is presented below (*see* table 4.2 for the complete example):

> IF the goal is to iterate through the rows of LV column
> and LV row is the last row of LV column
> and LV row has been processed
> and the running total is of the form "LVstring + LVdigit,"
> THEN write LVdigit
> and set carry to LVstring
> and mark LVcolumn as processed
> and POP the goal.

[where LV = local variable]

> Local variables can be reassigned to new values each time the production applies. Thus, for instance, the terms LVcolumn, LVrow, LVstring, LVdigit will match to whatever elements lead to a complete match of the condition to working memory. Suppose, for instance, that the following elements were in working memory:

> The goal is to iterate through the rows of Column 2.
> Row x is the last row of Column 2.
> Row x has been processed.
> Running total is of the form 2 + 4.
>
> The production would match this working memory information with the following variable bindings:
>
> LVcolumn = Column 2.
> LVrow = Row x.
> LVstring = 2.
> LVdigit = 4.
>
> Local variables assume values within a production for the purposes of matching the condition and executing the action. After application of the production, variables lose their values. (ANDERSON 1982:373-74)

#### 4.3.1.3 Learning in ACT

In the ACT model skill performance is more closely related to productions than to declarative knowledge. This is so because facts are actually used by productions and it is the latter that exercises control over cognition. However, it is claimed in the model that when first learning a skill, a person initially learns facts about this skill which are used interpretatively by general-purpose productions; only then will the specific productions for that skill be built (ANDERSON 1982:374).

This first step would correspond to the *declarative stage* of skill learning. Among other types of skill, Anderson worked with examples taken from areas like geometry and algebra. He observed that, as a rule, the instruction received by the learners does not specify a procedure to be applied, despite which, they manage 'to emerge from this type of instruction with an ability to generate behavior that reflects knowledge contained in the instruction' (1982:374-375). ANDERSON explains this by saying that learners must rely on existing general procedures that will use the information contained in the instructions as a guide to acquisition of new skills:

> The basic claim is that general interpretative procedures with no domain-specific knowledge can be applied to some facts about the domain and produce coherent and domain-appropriate behavior. (ANDERSON 1982:375)

Table 4.2 A production system for performing addition (e.g., 614+438+683)

P1. IF the goal is to do an addition problem,
THEN the subgoal is to iterate through the the columns of the problems.

P2. IF the goal is to iterate through the columns of an addition problem
and the rightmost column has not been processed,
THEN the subgoal is to iterate through the rows of that rightmost column
and set the running total to zero.

P3. IF the goal is to iterate through the columns of an addition problem
and a column has just been processed
and another column is to the left of this column,
THEN the subgoal is to iterate through the rows of this column to the left
and set the running total to the carry.

P4. IF the goal is to iterate through the columns of an addition problem
and the last column has been processed
and there is a carry,
THEN write out the carry

and POP the goal

P5. IF the goal is to iterate through the columns of an addition problem
and the last column has been processed
and there is no carry,
THEN POP the goal.

P6. IF the goal is to iterate through the rows of a column
and the top row has not been processed,
THEN the subgoal is to add the digit of the top row into the running total.

P7 IF the goal is to iterate through the rows of a column
and a row has just been processed
and another row is below it,
THEN the subgoal is to add the digit of the lower row to the running total.

P8. IF the goal is to iterate through the rows of a column
and the last row has been processed
and the running total is a digit,
THEN write the digit
and delete the carry
and mark the column as processed
and POP the goal.

P9. IF the goal is to iterate through the rows of a column
and the last row has been processed
and the running total is of the form "string + digit,"
THEN write the digit
and set carry to the string
and mark the column as processed
and POP the goal.

P10. IF the goal is to add a digit to a number
and the number is a digit
and a sum is the sum of the two digits,
THEN the result is the sum
and mark the digit as processed
and POP the goal.

P11. IF the goal is to add a digit to a number
and the number is of the form "string + digit"
and a sum is the sum of the two digits
and the sum is less than 10,
THEN the result is "string + sum"
and mark the digit as processed
and POP the goal.

P12. IF the goal is to add a digit to a number
and the number is of the form "string + digit"
and a sum is the sum of the two digits
and the sum is of the form "1+ digit*"
and another number sum* is the sum of 1 plus string,
THEN the result is "sum* + digit*'
and mark the digit as processed
and POP the goal.

(ANDERSON 1982:371)

That is, when ANDERSON (1982:375) claims that 'knowledge in a new domain always starts out in declarative form', he does not mean that a learner is simply going to add facts to build new skills or that the learner is going to verbalise every single step in the initial acquisition. He means that instructions, facts, images or any other type of declarative knowledge (the choice of the term *declarative*, as previously noted, is not the most appropriate) will be the basic material on which general interpretative procedures are going to act. New productions are going to be formed in an attempt to achieve the desired result, but these productions are at a 'rough' level and have not yet been collapsed and proceduralized.

Anderson argues that this initial processing of declarative knowledge through interpretative procedures is necessary for the safety of the whole cognitive system:

> Because productions have direct control over behavior, there is the ever present danger that a new production may wreak great havoc in a system. Anyone who incrementally augments computer programs will be aware of this problem. [...] declarative knowledge can have impact on behavior, but that impact is filtered through an interpretive system that is well oiled in achieving the goals of the system. This does not guarantee that new learning will not result in disaster, but it does significantly lower the probability. If a new piece of knowledge proves to be faulty, it can be tagged as such and so disregarded. It is much more difficult to correct a faulty procedure. (ANDERSON 1982:380)

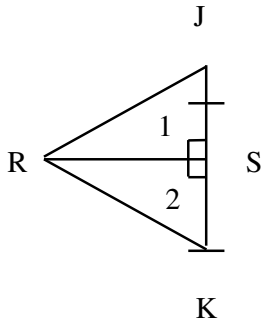
This interpretation of declarative knowledge offers this kind of safety, but at the cost of being a slow process. Declarative knowledge from long-term memory is brought to short-term memory, where it must remain available for the interpretative productions to act. Small production steps will be taken in order to achieve the necessary generality. There is a burden on working memory capacity.

A protocol from a student trying to solving a geometry problem (*see* fig. 4.) where the use of a new postulate was required may give an idea of what this burden is. It transcribes what the student reported on the process of learning the new skill:

> If you looked at the side-angle-side postulate [long pause] well RK and RJ could almost be [long pause] what the missing [long pause] the missing side. I think somehow the side-angle-side postulate works its way into here [long pause]. Let's see what is says "two sides and the included angle." What would I have to have to have

> two sides. JS and KS are one of them. Then you could go back to RS=RS. So that would bring up the side-angle-side postulate [long pause]. But where would ∠1 and ∠2 are right angles fit in [long pause] wait I see how they work [long pause] JS is congruent to KS [long pause] and with Angle 1 and Angle 2 are right angles that's a little problem [long pause]. OK, what does it say - check it one more time: "If two sides and the included angle of one triangle are congruent to the corresponding parts." So I have got to find the two sides and the included angle. With the included angle you get Angle 1 and Angle 2. I suppose [long pause] they are both right angles, which means they are congruent to each other. My first side is JS is to KS. And the next one is RS to RS. So these are the two sides. Yes, I think it is the side-angle-side postulate. (ANDERSON 1982:381-82).

Fig. 4.2 The first proof-generation problem that a student encounters that requires application of the side-angle-side postulate.




Given: ∠1 and ∠2 are right angles
JS = KS
Prove: ΔRJS = ΔRSK

(ANDERSON 1982:382)

Thus, the first time the student did the task, he had to mentally rehearse many steps, going backwards and forwards to check his way to the solution. This is characteristic of the declarative stage. However, after some more similar problems, the student's protocol was similarly as follows:

> Right off the top of my head I am going to take a guess at what I am supposed to do: ∠DCK= ∠ABK. There is only one of two and the side-angle-side postulate is what they are getting to. (1982:382)

Two things are noticed: a speedup in the application of the postulate, and the fact that there was no verbal rehearsal of the statement of the postulate. Anderson believes that, in this instance, the student is no longer calling a representation of the problem into working memory. It is also noticed that 'in the first protocol there is a clear piecemeal application of the postulate by which the student is separately identifying every element of the postulate', which is absent in the second protocol (ANDERSON 1982:382). This is the *knowledge compilation* stage that follows the declarative stage and which is characterised by the three features just mentioned: speedup, dropout of verbal rehearsal, and elimination of piecemeal application.

There are two subprocesses in the *knowledge compilation* stage: *composition* (the collapsing into one single production of sequences of productions that follow each other in solving a particular problem) and *proceduralization* (the building-up of new versions of the productions that do not require the domain-specific declarative information to be retrieved into working memory'). ANDERSON (1982:383) uses a simple example taken from everyday life:

> It has been noted (Anderson 1976) that people develop special procedures for dialing frequently used telephone numbers. Sometimes declarative access to the number is lost and the only access one has to the number is through the procedure for dialing it.
>
> Consider the following productions that might serve to dial a telephone number:
>
> P1. IF the goal is to dial LV telephone number
> and LV digit 1 is the first digit of LV telephone number,
> THEN dial LV digit 1.
> P2. IF the goal is to dial LV telephone number
> and LV digit 1 has just been dialed
> and LV digit 2 is after LV digit 1 in LV telephone number,
> THEN dial LV digit 2.
>
> Composition creates "macroproductions," which do the operation of a pair of productions that occurred in sequence. Applied to the sequence of Production P1 above followed by P2, composition would create
>
> P1 & P2. IF the goal is to dial LV telephone number
> and LV digit 1 is the first digit of LV telephone number
> and LV digit 2 is after LV digit 1,
> THEN dial LV digit 1 and then LV digit 2.
>
> Compositions like this reduce the number of production applications to perform the task.
>
> A composed production like P1&P2 still requires that the information (in this case, the phone number) be held in working memory. This information must be retrieved from long-term memory and matched to the second and third clauses in P1&P2. Proceduralization eliminates clauses in the condition of a production that require information to be retrieved from long-term memory and held in working memory. In the above production,

P1&P2, the second and third condition clauses would be eliminated. The local variables that would have been bound in matching these clauses are replaced by the values they are bound to in the special case. So suppose this production is repeatedly applied in the dialing of Mary's telephone number, which is 432-2815. The local variables in P1&P2 would be bound as follows:

LVtelephone-number = Mary's number.
LVdigit1 = 4.
LVdigit2 = 3.
Producing the substitution of these values for the variables and eliminating the second and third condition clauses we get

P1&P2* IF the goal is to dial Mary's telephone number,
THEN dial 4 and then 3.

By continued composition and proceduralization, a production can be built that dials the full number.

P*. IF the goal is to dial Mary's telephone number,
THEN dial 432-2815.

It should be noticed that this new production is not necessarily going to erase the declarative representation of the knowledge. In fact, knowledge compilation eliminates both the need for multiple production firings and the need for retrieval from declarative knowledge, but it does not result in the elimination of the original production rules or the declarative knowledge used.[7]

The resulting knowledge-specific production reduces the load on working memory, freeing the system to perform a second task which is demanding working memory space. Besides this, the *composition* mechanism also presents two conditions whose purpose is to eliminate the risk of 'spurious' pairs of productions, such as in the example below:

[...]
P2 IF I hear footsteps in the aisle,
THEN the teacher is coming my way.
P3. IF the goal is to add two digits
and a sum is the sum of the two digits,
THEN the result is the sum
and POP.

[7] These initial productions and declarative knowledge can remain as alternatives for the performance of the task. The choice among the several paths for the performance of a task will be determined by conflict resolution principles. These principles will not be examined in this discussion, with the exception of the strengthening mechanism to be mentioned in the proceduralization stage. It may only be interesting to know that later Anderson devised a formula to determine the speed and performance of a production: SAG/NI, where A is 'the level of activation of the data elements to which it matches', G is 'the degree to which the condition of the production rule is matched', S is the strength of the production, I is the 'strength of other productions that match the same declarative elements as the production of interest', and N is 'the degree of overlap in the data elements to which the competing productions match' (ANDERSON 1992:169).

A resulting production could be:

> P2&P3. IF I hear footsteps in the aisle
> and the goal is to add two digits
> and a sum is the sum of the two digits,
> THEN the teacher is coming my way
> and the result is the sum
> and POP. (ANDERSON 1982:384)

The two conditions to avoid this possibility are that (a) 'productions are composed only if they are linked by goal setting' and (b) 'productions that are linked by goal setting will be composed even if there are intervening productions that make no goal reference' (385).

In Anderson's theory there is a constant concern with the way the learning system avoids running risks. In the knowledge compilation stage, composition results in encoded sequences of productions for a task which still remain general. Only with *proceduralization* do productions become specific for a task. That is, the system requires proof of the need for and mastering of a new skill to accept specialising productions to that degree. It is in relation to this aspect that Anderson emphasises an important difference between human processes and computer processes:

> We can understand why human compilation is gradual (in contrast to computer compilation) and occurs as a result of practice if we consider the difference between the human situation and the typical computer situation. For one thing the human does not know what is going to be procedural in an instruction until he or she tries to use the knowledge in the instruction. In contrast, the computer has built in the differences between program and data. Another reason for gradual compilation is to provide some protection against the errors that enter into a compiled procedure because of the omission of conditional tests. [...] If the procedure transits gradually between the interpretive and compiled stages, it is possible to detect the erroneous compiling out of a test at a stage where the behavior is still being partially monitored interpretively and can be corrected. (ANDERSON 1982:389)

After a skill reaches this stage, it can be further developed not only in terms of *speed* but also in terms of *tuning*. These are the two processes of the *procedural* stage, the third stage in the acquisition of a new skill. *Tuning* has to do with improving the selectivity with which the method of performing a task is chosen. If tasks requires that

a search be made to find the possible successful paths to be followed, the system will have to able to discard those that offer more complex solutions than necessary.

The *tuning* in the proceduralization process relies on three main mechanisms:

> [...] a generalization process by which production rules become broader in their range of applicability, a discrimination process by which the rules become narrower, and a strengthening process by which better rules are strengthened and poorer rules weakened.[...] One can think of production rules as implementing a search, where individual rules correspond to individual operators for expanding the search space. Generalization and discrimination serve to produce a "metasearch" over the production rules, looking for the right features to constrain the application of these productions. Strength serves as an evaluation for the various constraints produced by the other two processes. (*emphasis added*; ANDERSON 1982:390)

In his explanations of these mechanisms, Anderson refers to examples on language acquisition, more specifically about the acquisition of production rules for the generation of correct syntactic structures. In certain domains, like that of the geometry example given above, if a first path for the solution of the problem fails, a second one is tried and, consequently, more time is spent to generate the desired proof. In language, ANDERSON (1982:390) notices, 'if the wrong generation path is followed, a faulty syntactic structure will be generated', that is, 'errors of choice or search in language generation result in incorrect generations'.

The first tuning mechanism, the *generalisation* process, explains the feature of productivity or 'the ability to perform successfully in novel situations' (ANDERSON 1982:390). It refers, for instance, to a speaker's ability to produce and understand novel utterances. Anderson gives a simple example of what could happen at a certain stage in the acquisition of the plural forms in English, after some productions have been compiled to encode specific instances of phrases:

> P1. IF the goal is to indicate that a coat belongs to me,
> THEN say "My coat."
> P2. IF the goal is to indicate that a ball belongs to me,
> THEN say "My ball."
>
> From these production rules, ACT can form the following generalization:
>
> P3. IF the goal is to indicate that LV object belongs to me,
> THEN say "My LV object,"

> in which the variable LV object has replaced the particular object. The rule now formed is productive in the sense that it will fill in the LV object slot with any object. [...] It is important to notice that the general production does not replace the original two and that the original two will continue to apply in their special circumstances. (ANDERSON 1982:391)

This process basically takes from different specific productions what they have in common, so that the resulting new production can be applied to new situations. In the following example, still concerning pluralization rules in English, Anderson checks the use of the generalisation process and points out the need for a complementary tuning mechanism, the *discrimination* process:

> P4. 'IF the goal is to indicate the relation in (LVobject1 chase LVobject2)
> and LVobject1 is dog
> and LVobject1 is singular
> and LVobject2 is cat
> and LVobject2 is plural,
> THEN say "CHASES."
> P5. IF the goal is to indicate the relation in (LVobject3 scratch LVobject4)
> and LV object 3 is cat
> and LV object3 is singular
> and LV object4 is dog
> and LV object4 is plural,
> THEN say "SCRATCHES."
> P6. IF the goal is to indicate the relation in (LV object1 LV relation LV object2)
> and LV object 1 is singular
> and LV object 2 is plural,
> THEN say "LV relation + s."
>
> P6 is the generalization that would be formed from P4 and P5. It illustrates that clauses can be deleted in a generalization as well as variables introduces (in this case LVrelation). In this example, the generalization has been made that the verb inflection does not depend on the category of the subject or of the object and does not depend on the verb. This generalization remains overly specific in that the rule still tests whether the object is plural - this is something the two examples have in common. Further generalization would be required to delete this unnecessary test. On the other hand, the generalized rule does not test for present tense and so is overly general. This is because this information was not represented in the original productions. The discrimination process (to be described later) can bring in this missing information. (ANDERSON 1982:391)

The main aim of the discrimination process is to restrict the possibilities of application of overly general productions, like the one in the example. It acts on the basis of correct and incorrect examples of application of the production:

> The discrimination algorithm remembers and compares the values of the variables in the correct and incorrect applications. It randomly chooses a variable for discrimination from among those that have different values in the two applications. Having selected a variable, it looks for some attribute that the variable has in only one of the situations. A test is added to the condition of the production for the presence of this attribute.
>
> An example. Suppose ACT starts out with the following production:
>
> P1. IF the goal is to indicate the relation in (LV subject LV relation LV object),
> THEN say "LV relation + s."
>
> This rule for generating the present tense singular of a verb is, of course, overly general in the above form. For instance, this rule would apply when the sentence subject was plural, generating "LVrelation + s," when what is wanted is "LVrelation." By comparing circumstances where the above rule applied correctly with the current incorrect situation, ACT could notice that the variable LVsubject was bound to different values and that the value in the correct situation had singular number but the value in the incorrect situation had plural number. ACT can formulate a rule for the current situation that recommends the correct action:
>
> P2. IF the goal is to indicate the relation in (LV subject LV relation LVobject)
> and LV subject is plural,
> THEN say "LV relation."
>
> ACT can also form a modification of the previous rule for the past situation:
>
> P3. IF the goal is to indicate the relation in (LV subject LVrelation LV object)
> and LV subject is singular,
> THEN say "LV relation + s."
> (ANDERSON 1982:392-93)

Anderson calls the first type of discrimination, P2, an *action discrimination* (it involves learning a new action). The second type, P3, is a *condition discrimination* (it restricts the condition for the old action). An action discrimination will be formed when there is some feedback about the correct action for the situation. In the feedback available is simply that the old action is incorrect, only a condition discrimination can be formed. Neither discrimination replaces the original production (they all coexist).

Anderson qualifies the *generalisation* and *discrimination* mechanisms as inductive because 'they are trying to extract from examples of success and failure the features that characterize when a particular production rule is applicable' (ANDERSON 1982:394). These mechanisms create multiple variants on the conditions controlling the same action. The problem is that they may result in incorrect production, such as overgeneralizations and useless discriminations. To

eliminate wrong productions resulting either from those mechanisms or simply from general system errors (misinformation or mistakes in computation) there is another tuning mechanism in ACT, which is the *strengthening* process. Throughout this discussion of the different mechanisms, it is necessary to keep in mind the complexity of the system which at any time can be considering 'as its hypothesis a set of different productions with different conditions to control the action - not just a single production (condition-action rule)' (ANDERSON 1982:394).

This last tuning mechanism in ACT refers to a *strength* presented by every production that determines the probability of its use in any given situation:

> The strength of a production affects the probability that it will be placed on the APPLYLIST and is also used in resolving ties among competing productions of equal specificity on the APPLYLIST. [...] ACT has a number of ways of adjusting the strength of a production in order to improve performance. Productions have a strength of .1 when first created [arbitrary values are used]. Each time it applies, a production's strength increases by an additive factor of .025. However, when a production applies and receives negative feedback, its strength is reduced by a multiplicative factor of .25. Because a multiplicative adjustment produces a greater change in strength than does an additive adjustment, this "punishment" has much more impact than a reinforcement does.
>
> Although these two mechanisms are sufficient to adjust the behavior of any fixed set of productions, additional strengthening mechanisms are required to integrate new productions into the behavior of the system. Because these new productions are introduced with low strength, they would seem to be victims of a vicious cycle: They cannot apply unless they are strong, and they are not strong unless they have applied. What is required to break out of this cycle is a means of strengthening productions that does not rely on their actual application. This is achieved by taking all of the strength adjustments made to a production that applies and making these adjustments to all of its generalizations as well. Because a general production will be strengthened every time any one of its possibly numerous specializations applies, new generalizations can amass enough strength to extend the range of situations in which ACT performs successfully. Also, because a general productions applies more widely, a successful general production will come to gather more strength than its specific variants.' (ANDERSON 1982:395; *emphasis added*)

To summarise, the stages and main processes involved in learning in the ACT model are presented in the following table:

Table 4.3 Anderson's model of skill acquisition: the stages and their processes

**declarative**: declarative knowledge is interpreted by general interpretative procedures with no domain-specific knowledge

**knowledge compilation**: involves the processes of composition (a sequence of productions is collapsed into a single production that has the effect of the sequence) and proceduralization (the building-up of new versions of the productions that do not require domain-specific declarative information available in working memory)

**procedural**: involves the processes of speedup (as a result of further composition and proceduralization) and tuning (the improvement in the selectivity of alternate paths for the performance of a task). Three basic mechanisms of tuning are:
(a) generalisation (production rules become broader in their range of applicability)
(b) discrimination (production rules become narrower in their range of applicability): there are action discriminations (when the mechanism involves learning a new action) and condition discriminations (when the mechanism involves restricting the condition for the old action)
(c) strengthening (better rules are strengthened and poorer rules are weakened)

(original)

4.3.1.4 Consciousness, control and strategy in Anderson's work

In the whole presentation of the theory summarised above, there is no direct reference to the question of consciousness. Nevertheless, there is an article (ANDERSON 1987) in which Anderson discusses some consequences derived from the main characteristics of this model and touches on the topic of consciousness and automaticity. Besides, it is also possible to analyse the general statements of the theory with regard to the question of consciousness.

In terms of what most information-processing theories have in common, it may be said that they usually identify consciousness with a limited capacity memory system and claim that processing through this system is necessary for permanent storage. In Anderson's view of the development of procedural knowledge, this corresponds to the role of working memory and the assertion that the acquisition of any skill starts with the use of declarative knowledge. That is, awareness is required in the early stages of skill acquisition.

As Anderson pointed out, processes that require that information be brought from long-term memory to working memory present a cost in terms of processing time that is counterbalanced by their safety and control (ANDERSON 1982:381). Basically, he follows a common cognitive distinction between controlled and automatic processes which associates control with consciousness/awareness and automaticity with unconsciousness. Control is also usually associated with novice behaviour (as in Anderson's model), and hence with learning, since it is argued that skilled behavior begins as a controlled process and gradually becomes automatic through practice.

In relation to strategies, it is important to notice that since the late 70's it has been acceptable to equate the term *controlled* with *strategic* in the cognitive sciences when referring to processes that are flexible but slow because of their demand of limited capacity memory resources (TANENHAUS 1988:19). When Anderson and his colleagues refer to research involving strategies, they deal with those controlled processes (used to solve unfamiliar or taxing problems) of which subjects/learners are conscious enough to provide a verbal protocol (KOEDINGER, K.R., & TABACHNECK, H.J.M.: 1994**;** SINGLEY, M.K.; ANDERSON, J.R.: 1989.; KOEDINGER, K.; ANDERSON, J. R.:1991).

In the article mentioned at the beginning of this section (ANDERSON 1987), Anderson tries to compare some predictions of his model concerning consciousness and automaticity with research findings. He analyses some of the mechanisms in the overall process of acquiring a new skill. His model predicted that the inductive learning mechanisms of generalisation and discrimination[8] would be automatic, which also means 'not subject to strategic influences and not open to conscious inspection' (ANDERSON 1985:205). He knew that REBER's findings (1976; *see* chapter 3) would confirm this. He observes, however, that later there were experiments which showed evidence that generalisations can be subject to strategic control (ELLIO and ANDERSON 1984), and then there was the replication of Reber's experiment by DULANY, CARLSON and DEWLEY (1984) which demonstrated that learners have some conscious control of the learning situation (they can notice regularities in the example sentences and form low-level rules). Furthermore, it was noticed that

[8] These mechanisms are also called syntactic methods: 'they only look at the form of the rule and the form of the contexts in which it succeeds or fails' and make no use of semantic knowledge (ANDERSON 1985:205).

learners can form generalisations from a single example (ELLIO and ANDERSON 1983; KIERAS and BOVAIR 1986), when the mechanism requires the processing of a number of examples and should work without relying on semantic resources. Considering these findings, Anderson was able to offer the following explanation:

> The inductive processes of generalization and discrimination are things that can be implemented by a set of problem-solving productions. [...] Since the information used by the productions has to be in working memory, people should have conscious access to the information they are using for induction, which they apparently do. Knowledge compilation can convert these inductive problem-solving episodes into productions that generalize beyond the current example. (ANDERSON 1985:205-6)

As for the compilation and strengthening processes that follow, research findings and theoretical hypothesis are not conflicting in relation to their unconscious aspect:

> Subjects have not reported the changing strengths of their procedures nor compilation of productions. Thus, these learning processes do not seem to involve computations that leave partial products in working memory to be reported, in contrast to discrimination and generalization, which do. (ANDERSON 1985:206)

The question of consciousness/awareness in Anderson's three-stage model can be summarised as follows:

(a) the initial *declarative stage* of skill acquisition necessarily involves awareness (new information has to go through the working memory to be encoded in long-term memory and general interpretative procedures require that declarative knowledge be available in working memory);

(b) in the *knowledge compilation stage*, the mechanisms of composition and proceduralization are unconscious (they do not 'leave partial products in working memory');

(c) in the final *procedural stage*, the unconscious speed-up caused by proceduralization continues, but in relation to tuning, while the mechanism of strengthening remains unconscious, the subject/learner still counts with some conscious access to the inductive mechanisms of generalisation and discrimination.

#### 4.3.1.5 Comments on the summary

I have gone into details of the stages of skill acquisition proposed by Anderson to show the complexity of the mechanisms and to avoid over-simplifications that may lead to a mistaken interpretation of his theory. In the article that served as the basis for the previous summary (ANDERSON 1982), Anderson has already opted for a very simplified version of the syntax used in the actual computer model that tests the mechanisms.

The summary tries to reflect the main ideas of Anderson's theory as it was presented at the time of O'Malley and Chamot's work on LSs. Since 1976 his model has been constantly revised with new versions being developed (ANDERSON 1976, 1983, 1989, 1990). It has remained as the state of the art in simulations of cognition based on production systems. However, as Anderson noticed, like other analyses of human behaviour, his theory is just 'an approximation to characterize a rather complex system of interactions' (ANDERSON 1987:403). He continues to be challenged by difficult questions, such as the nature and origin of the general interpretative procedures and the need of evidence for productions in memory.

### 4.3.2 O'Malley and Chamot's interpretation

O'Malley and Chamot are concerned with explaining LSs as complex cognitive processes that can be described in terms of Anderson's theory 'as a set of productions that are compiled and fine-tuned until they become procedural knowledge' (O'MALLEY and CHAMOT 1990:43). To do so, they condense the main points of Anderson's theory in one chapter (chapter 2), in which they immediately present their view of LSs as cognitive skills. They still devote chapter 3 to the discussion of some cognitive concepts in relation to second language acquisition, including there the topic of consciousness. The remaining chapters organise their previous research involving strategies used by L2 and FL students, instruction in LSs, and the models and materials they developed.

We can point out some problems in their summary of Anderson's model, but they manage to give examples of processes usually considered as LSs whose acquisition can be described as similar to that of any other skill. The main difficulty,

however, lies in the basic definition of LSs and the discussion about consciousness. Firstly, let us analyse some of the problems in their explanation of the theory. Then, let us focus again on LSs.

They first present the distinction between declarative and procedural knowledge. These concepts are explained without any problems. They are careful enough to call attention to the fact that declarative knowledge is not necessarily verbal, nor can it always be verbally described:

> Examples of things we know about [declarative knowledge] include the definitions of words, facts (such as "George Washington was the first president of the United States"), and rules (such as "i before e except after c"). Declarative knowledge need not be verbal. Although it often takes the form of abstract propositions, declarative knowledge can also take the form of temporal strings [...], such as our memory for the order of events - that is, which things came earlier and later in our lives - or the form of images [...], such as our memory for what a zebra looks like or the arrangement of our living room. Although the following rule of thumb is not always true, declarative knowledge can usually be expressed verbally, or "declared." Thus, we typically are able to describe the contents of declarative knowledge. (O'MALLEY and CHAMOT 1990:20)

As for procedural knowledge, they manage to introduce the basic representation designed by Anderson, to the effect that procedural knowledge is stored in memory as production systems. They present its basic form (condition-action pairs) and explain that with practice it develops from a declarative representation to automatic execution in production sets. They do not make it clear, at this point, that a production system or set involves the collapsing of several basic productions. The first problem may be the absence of any observation about Anderson's simplified syntax in the examples of productions. This may obscure the fact that his theory is based on artificial intelligence research, which implies a comparison between human cognitive processing and computer processing.

The main difficulty in their text is to understand the stages of skill acquisition as proposed by Anderson. There is some confusion in the terminology used: first, they refer to the cognitive, associative and autonomous stages, using Fitts' terminology; then, they give some details about the stage of knowledge compilation, which is Anderson's term for Fitts' associative stage. In relation to the declarative stage (or Fitts' cognitive stage), some essential characteristics are mentioned, such

as the learners' awareness of the process, their capacity to describe it verbally, and the idea that it does not refer simply to formal learning through presentation of rules ('learners are instructed how to do the task, observe an expert doing the task, or attempt to figure it out and study it themselves', O'MALLEY and CHAMOT 1990:25). They also point out that the knowledge acquired at this stage is not adequate for skilled performance. Nevertheless, no mention is made of the interpretative procedures that are used to process declarative knowledge (instructions, models, examples, facts). Therefore, the initial formation of productions is not mentioned either. In fact, because they neglect to mention the existence of interpretative procedures, the idea is conveyed that the first stage of the whole process of proceduralization is the process of formation of declarative knowledge. This confusion is evident when they mention, as examples of the knowledge resulting from this stage, the memorisation of vocabulary and explicit grammar rules (O'MALLEY and CHAMOT 1990:25-26). These examples actually refer to the declarative knowledge that can be used by working memory so that general interpretative procedures can be applied in the first attempts to perform a new skill. The process of formation of a trial production is declarative because of the learner's controlled use of declarative knowledge (*see* item 4.3.1.3 above). The result is not a grammar rule in declarative form, but a production containing information about how to process language based on the information available (formal rules from grammar, direct samples of language, examples of the rule, etc.).

This initial lack of clarity already makes it difficult to understand their explanation of the second and third stages. The terminology problem persists with the presentation of a paragraph about the *associative* stage and one about the *autonomous* stage (Fitts' terminology), followed by references to specific mechanisms of the stage of *knowledge compilation* (Anderson's equivalent to Fitts' associative stage). They mention the example of the grammar rule[9], now correctly emphasising the fact that in this model procedural knowledge does not necessarily obliterate declarative knowledge in long-term memory. But, as no mention is made of the formation of specific productions and how they develop into production systems,

[9] Again, O'MALLEY and CHAMOT should make it clear that a memorised grammar rule is not a production. It is declarative knowledge, stored in long-term memory as any other fact could have been stored. In the learner's mind, there may be a production, individualised or as part of a production set, that used this piece of information in an attempt to produce a corresponding linguistic behaviour.

the idea they give is that there is a direct leap from declarative knowledge to productions.

As there is no cross-reference between the paragraphs about the associative stage and about knowledge compilation, it is not clear that they are the same stage and it is not clear what the specific processes of this stage are. Strengthening is mentioned in the associative stage, but with a general meaning (strengthening of the connections among the various components of the skill), not as the specific mechanism mentioned by Anderson in last phase of proceduralization (O'MALLEY and CHAMOT 1990:25-27). As for the explanation of the two processes of knowledge compilation, they present the following:

> This process of skill acquisition is referred to as *knowledge compilation* and contains two basic components: *proceduralization* and *composition* (Gagné 1985). In proceduralization, the learner generates a propositional representation of a sequence of actions and converts this propositional representation into productions systems. Composition consists of combining several productions that have already become automatic into a single production [...] . (O'MALLEY and CHAMOT 1990:26-27)

As has been seen in the above summary, first there is composition, when sequences of productions that follow each other collapse into 'macro-productions' which still remain general (the local variables - LVs - have not yet been replaced by the values that only apply in one special case - *see* the example of dialling a phone number in item 4.3.1.3 above). Task-specific productions appear only with proceduralization, which eliminates clauses in the condition of a production that require information to be retrieved from long-term memory and held in working memory, filling out the variable slots with specific values. Each step in this process requires repeated practice or use of the productions and, then, the macro-productions. The fine-tuning of the resulting production systems will continue not only with the speedup of the process through further practice, but also with more effectiveness brought about by the generalisation, discrimination and strengthening mechanisms (previously discussed). In their summary, O'MALLEY and CHAMOT (1990:26) only refer to the general process of fine-tuning and the automatization of successful performance of a skill

As a result of all these problems, their explanation of the stages in Anderson's theory is confusing. However, their argument that processes classified as learning strategies, especially in the metacognitive and cognitive categories, can be seen as

complex learned skills, and can thus be represented in memory as production systems, seems apparently tenable, especially when they present some possible examples of productions. In *The CALLA Handbook* (CHAMOT and O'MALLEY 1994:15) there is the example of a possible production for *inferring meaning* while reading:

1. **IF** I encounter a word I don't know,
   and the word is needed to understand the sentence,
   **THEN** guess the meaning of the word.

2. **IF** I want to guess the meaning of the word,
   and the word is connected to the paragraph meaning,
   **THEN** determine if the paragraph meaning cues the word.

3. **IF** the paragraph meaning does not cue the word meaning,
   and I still believe the word is important,
   **THEN** determine the word's part of speech.

4. **IF** I want to define the word's part of speech,
   and the word conveys the action of the sentence,
   **THEN** the word must be a verb.

5. **IF** the word is a verb,
   and the sentence occurs in the past,
   **THEN** the verb must be in the past tense.

In their theoretical book (O'MALLEY and CHAMOT 1990:52), there are short examples of *strategy applications*, which imply productions like the above:

IF the goal is to comprehend an oral or written text,
and I am unable to identify a word's meaning,
THEN I will try to infer the meaning from context.

IF the goal is to comprehend a concept in a written text,
and I know the concept is not at the beginning,
THEN I will scan through the text to locate the concept

IF the goal is to comprehend and remember an oral passage,
and I have heard a complete passage or thought expressed,
THEN I will summarize the passage to ensure I understand it.

IF I have heard a complete oral passage expressed,
and I am unable to summarize the passage,
THEN I will ask the speaker to repeat the passage.

What is frustrating in their whole theoretical discussion is the difficulty of linking the basic definition of LSs, where consciousness plays an essential role, with the

concept of procedural knowledge, which is characterised by its unconscious automatic processing. As was seen in chapter 2, they use Weinstein and Mayers's definition as their basis:

> (a)Learning strategies, according to Weinstein and Mayer (1986), have learning facilitation as a goal and are intentional on the part of the learner. The goal of strategy use is to "affect the learner's motivational or affective state, or the way in which the learner selects, acquires, organized, or integrates new knowledge" (Weinstein and Mayer 1986, p.315). (O'MALLEY and CHAMOT 1990:43; *emphasis added*)

> (b)Learning strategies are defined as thoughts or activities that assist in enhancing learning outcomes. Strategies by definition are probably performed with **awareness** or else they would not be strategic, although the same mental operations can be performed without awareness once they are proceduralized and have the same beneficial results with learning.' (CHAMOT and O'MALLEY 1994:60; *emphasis added*)

It becomes even clearer that we are back to the difficulty of establishing the difference between processes and strategies when the passages above are contrasted with one of their definitions of learning, mentioned at the beginning of this section. Referring to GAGNÉ 1985 and SHUELL 1986, CHAMOT and O'MALLEY (1994:58) stated that

> (c) [...] learning is an active, dynamic process in which learners select information from their environment, organize the information, relate it to what they already know, retain what they consider to be important, use the information in appropriate contexts, and reflect on the success of their learning efforts.'

They also state that '[t]his type of learning is often conscious and deliberate, although individuals who are highly accustomed to learning in this manner may do so rapidly and without a great deal of immediate awareness of their thoughts' (CHAMOT and O'MALLEY 1994:58; *emphasis added*). All the processes mentioned in the definition of learning have equivalents in classifications of LSs and the subsequent statement makes it seem that nearly everything in language learning is *strategic*. It does not help too much to refer back to the introduction of their 1990 book and find the following explanation:

> (d) In cognitive theory, individuals are said to “process” information, and the thoughts involved in this cognitive activity are referred to as “mental processes.” Learning strategies are special ways of processing information that enhance comprehension, learning, or retention of the information.’ (O'MALLEY and CHAMOT 1990:1)

In these general statements about LSs (*a*, *b* and *d* above) , the use of words like *assist*, *facilitation*, *enhance* and *special* give the idea that LSs can be seen as distinct, auxiliary processes. Apparently, awareness is taken as a distinctive feature. In the statement about learning (c above), however, this feature is not distinctive any longer. It does not matter if the statement is interpreted as referring to learning through the use of learning strategies (because of the example of processes that are given) or to learning processes in general. It seems that they are unable to take a position, and using Anderson’s frame to explain LSs as complex skills does not facilitate the question.

On the one hand, RABINOWITZ and CHI’s position (1987) is mentioned: strategies must be conscious in order to be strategic (O'MALLEY and CHAMOT 1990:52). On the other hand, they consider LSs as procedural knowledge that must develop from an initial conscious stage to a final unconscious one and, if this is the case, they have to refer to automatic strategies, as they actually do in the following passage:

> Because controlled processing places an extra burden on attentional processes, the learner might easily be inclined to reduce the cognitive load by not performing the strategy or by using a more familiar but less efficient strategy. [...] The learner who sees the task as too familiar or too difficult may not be inclined to use a new strategy, but may rely upon automatic problem solution strategies (productions) that have already been learned. (O'MALLEY and CHAMOT 1990:52-53; *emphasis added*)

In Anderson’s theory there are the equations between consciousness and control and between unconsciousness and automaticity, which are pointed out and discussed by O'Malley and Chamot. Nevertheless, it is odd that in their discussion of this point they barely touch on the question of learning strategies. The focus is on what would determine the occurrence of automatic or controlled processes.

> The critical determinants of whether controlled or automatic processes are used seem to be the degree to which the procedural skill has been learned and the task familiarity or novelty of the information being processed. A

> highly learned skill with a familiar stimulus is likely to be associated with automatic processing, but may be associated with controlled processing when there is a change in the nature of the task or unfamiliar information is introduced. Poorly learned skills are likely to be associated with controlled processing, except in the circumstance where subskill components have been practiced sufficiently with repeated information. In second language acquisition, an individual who is presented with unfamiliar language elements may shift from automatic to controlled processing. [...] Faerch and Kasper (1987) join Anderson (1985) in suggesting that automatic mental processes are performed without awareness with familiar information, but that the processes become conscious when the learner encounters novel or unfamiliar material. (O'MALLEY and CHAMOT 1990:80)

In conclusion, in their discussion about LSs using Anderson's theory, what O'Malley and Chamot's were able to demonstrate was that a process classified as LS is similar to any other learning process which is taken as a skill and is represented as a production system. They are not successful in making a clear distinction between learning strategies and other learning processes, mainly because they do not pay enough attention to the question of consciousness. As they noted (O'MALLEY and CHAMOT 1990:42), Anderson is not concerned with making this distinction and he does not focus on the question of strategies. However, he works with the contrast between controlled and automatic processes and equates them with conscious and unconscious processes (ANDERSON 1987). As was previously mentioned, he even states that automatic processes are not subject to strategic influences (ANDERSON 1987:205). Thus, if his theory were taken as a basis to discuss learning strategies, it would be possible to consider a distinction based on the controlled/conscious characteristic of these processes. O'Malley and Chamot could have gone beyond other researchers in the area and given a theoretical basis to LSs that clarified their specific characteristics.

## 4.4 Conclusion

In O'Malley and Chamot's discussion, LSs end up being described like any other language learning process. The basic definition used still relies on their learning goal and on the learner's conscious use of them. A discussion of the conscious/unconscious contrast is crucial, but this is precisely one of the weak points in their work. If they were to stick to the distinction based on consciousness and to

the procedural description of LSs, the conclusion would be that LSs are ordinary learning processes in their conscious stage. More specifically, they are those processes that learners can describe. That is what is suggested in the final comments about consciousness in O'MALLEY and CHAMOT's work (1990:80-81):

> The question concerning awareness of mental processing bears upon research methodology in second language acquisition, since without awareness of otherwise automatic processes, learners would never be able to describe how they learn.
>
> [...] A cognitive model of second language acquisition sees active conscious processes involved in all language settings, at least in the initial stages of learning. These processes can be described and used to assist learning instead of being relegated to the uncertainty of unconscious mechanisms.

The word *assist* is used again, but this time referring to those conscious learning processes of which the learner is able to give a verbal account. They are not special or auxiliary processes. Maybe they are special in that these are the processes that can be researched, classified and analysed with the aim of facilitating or enhancing a language learner's development. In this case, Wenden's comment about the fact that some learners make unconscious use of LSs does not seem 'paradoxical' and she is correct in saying that strategy training is about raising learners' awareness in the learning process.

As learning strategies in TL acquisition have received considerable attention on the part of researchers, teachers, trainers and publishers, and have been treated as special and separate sets of learning processes, it was expected that questions concerning their theoretical status in TL studies would appear. In trying to answer these questions, as in O'Malley and Chamot's attempt, some expectation may have been created because of the apparent novelty of the subject of these studies. It looked as though a newly discovered set of processes had to be inserted in the models and theories of TL learning. In fact, they have always been there and the theoretical question about language learning strategies is to focus on the learning processes that are available to conscious introspection and verbalisation and on how an awareness raising process affects the learning process. In the case of O'Malley and Chamot, they became too concerned with describing the acquisition process and memory representation of LSs, which is the same as those of any learning process, and did not pay enough attention to the awareness that characterises the initial

acquisition stages of a considerable range of processes or to the awareness raising process that can facilitate the task of learning a language.

The main difficulty in dealing theoretically with strategies seems to lie precisely in the discussion of consciousness (or an alternative concept such as automaticity). Another example of this difficulty is found in a discussion by BIALYSTOK (1983), who continued working on learning models and also turned her attention to communication strategies. In the discussion I am referring to, she presents the following argument:

> ... there is little agreement as to which behaviours are not strategies but more properly belong to the domain of language learning 'processes'.
>
> Not only is there confusion in the literature between strategies and processes but also between types of strategies - learning, communication, interlanguage, and the like. *Consciousness* does not discriminate among these varieties - most mental processes are relatively automatic, but it is difficult to accept *automatic* as equivalent to *unconscious*. Further, the presence or absence of the introspective function does not convincingly distinguish conscious from unconscious mental activity; introspection provides a notoriously poor description of mental events. Hence even if the distinction between conscious and unconscious is accepted theoretically, its practical measurement is virtually impossible and its usefulness thereby decreased. (BIALYSTOK 1983:100-101)

There is some confusion in these comments. Indeed, consciousness does not distinguish between LSs, CSs or interlanguage. LSs and CSs are involved in the discussion of interlanguage, the internal linguistic system that a learner has constructed at a single point in time, but this refers to a whole theory of L2 acquisition. LSs and CSs are distinguished on the basis of the predominance of a learning or a communicative purpose, a distinction whose difficulty is not denied because, as Bialystok herself points out, these purposes are not inherent features of the strategy. Consciousness belongs to the discussion about the definition of strategy as opposed to process. Her position on the usefulness of the concept of consciousness is very close to McLaughlin's, and she is going to argue in favour of the distinction between controlled and automatic processes.

Just after these comments, Bialystok refers to the common idea of LSs as 'activities in which the learner may engage for the purpose of improving target language competence', and adds that these are revealed by the learner (1983:101). What she ends up pointing out is that when LSs are thought of as conscious processes used by the learner, the kind of consciousness implied is specifically

related with the learners' capacity to verbally report on what they do to learn or how they manage their learning. Bialystok may disagree with this view, questioning the value of verbal reports based on introspection and the validity of the introspection/consciousness relationship. In practice, however, this view is at the basis of most research on LSs. After her introductory discussion, even Bialystok chooses to give priority to pragmatic considerations, which in her article are related with the communicative effect of strategies, and thus has to count on the learners' capacity to report on their mental processes (1983:102).

In conclusion, the basic cognitive distinction between controlled or strategic processes and automatic processes which do not require the subject's awareness is valid for the discussion of language learning strategies (TANENHAUS 1988:19). In the language learning area, strategies have been receiving increasing attention in over 20 years of research and debate. A lot of effort has been spent on identifying and classifying them. The training programmes on LSs that have been more recently devised refer and work with those processes that through specific research methodology have been labelled as language learning strategies. In the target language learning area, what has been called language learning strategy does not refer only to a process that is used with a learning purpose and with cognitive control/awareness, but more specifically to that process of which a learner can give a verbal report. A learner's awareness does not necessarily imply that it is possible to give a verbal account of what is consciously going on in their minds, but the researcher's knowledge of the variety of LSs basically depends on this possibility. Thus the definition of language learning strategies must be thought of in terms of the learner's purpose and awareness when using them and the possibility of verbalising them.

## 4.5 Summary

While the learning purpose aspect was discussed when establishing the basic distinctions between learning, communication and production strategies in chapter 2 and the awareness aspect was the main focus of chapter 3 and 4, the fact that the concept of language learning strategies is dependent on a research requirement, that

is, that the process can be verbalised by the learner seems to have gone unnoticed and come to surface only at this point in the discussion.

In the next chapter, I intend to revise the previous chapters and the main references mentioned there so as to show how there is an implicit agreement on the question concerning the learner's capacity of verbalisation and the definition of LSs.

# 5 CONCLUSION

This chapter summarises what has been discussed here regarding the definition of the term *learning strategy* in the area of TL learning. In the first section, it presents the conclusions about how TL researchers treat the *learning aspect* of LLSs (in contrast with communication strategies) and about the debate concerning their *strategic aspect* and *consciousness*. It also points out that there is a third important aspect in the discussion about LLSs: the methodological aspect that involves *availability for verbal reports*, on which most of the TL research on LSs is based. In the second section of this chapter, as a suggestion for further research on this last aspect, a brief outline of the questions involving verbal reports and LS research is presented.

## 5.1 Summary and conclusions

This work focused on the question of how two terms, *learning* and *strategy*, have been put together and used in the field of target language acquisition. Although it is clear that learning strategies have to be defined in terms of their *learning aspect* and their *strategic aspect*, it has been seen that the discussion around these two aspects is not without difficulties.

Concerning the *learning aspect*, which was discussed in the initial part of this work (chapter 2), two points should be stressed. The first point is that the term *learning* strategy has to do with the learner's motivation in using a strategy. In this case, it is necessary to accept (a) the difficulty in measuring motivation, (b) the fact that a learner can use a strategy for more than one purpose (learning and communicative, for instance), and (c) that regardless of the purpose for which a strategy is used (e.g. learning), it can trigger unconscious processes which may bring unexpected consequences (e.g. solving a communication difficulty, developing social abilities) (TARONE 1981). The second point to be stressed is that although terms such as 'facilitate', 'enhance', and 'make easier' are used when explaining the role of language learning strategies in the learning process (CHAMOT 1987, OXFORD 1990), LSs are not positive or effective in themselves. The use of a strategy or set of strategies may affect learning positively or negatively depending on a series of

factors, for example, the type of task, the learner's level of linguistic competence, and/or the specific selection of strategies (*see* Fig. 2.1 in chapter 2). As a rule, researchers are aware of this aspect and make it clear at some point in their studies (RUBIN 1987:15; O'MALLEY and CHAMOT 1990:107-13), but terms such as 'facilitate', 'enhance' or 'make easier' (which usually appear in general statements at the beginning and in the conclusions of articles and studies) convey an oversimplified idea that lives room for misinterpretation.

One of the reasons for the persistent occurrence of this kind of simplification lies in the initial interest that guided the research of LSs in TL acquisition. There was the concern and enthusiasm for what good language learners could reveal about their learning process. Almost simultaneously with the question 'what do good learners do to learn?', it was asked how other learners could be trained to do the same. The first studies resulted in lists of 'essential' strategies for all language learners (RUBIN 1975; NAIMAN, FRÖLICH and TODESCO 1975). In later studies the complexity underlying the use of LSs began to appear, but there remained the focus on successful strategies and on the possibility of training learners to experiment with these strategies (CHAMOT 1987; OXFORD 1989, 1990; O'MALLEY and CHAMOT 1990).

Regarding the *strategic aspect* of the learning processes compiled in those studies, the analysis and discussion developed in the previous chapters have pointed to the conclusion that language learning strategies are characteristically *conscious* processes, despite the uncertainty or caution of a good number of researchers in stating that (WENDEN 1987; CHAMOT 1987;O'MALLEY and CHAMOT 1990; OXFORD 1990, 1992). It should be noted that there are researchers who pointed out that consciousness is at the root of the concept of strategy (RABINOWITZ and CHI 1987; COHEN 1990). Cohen, for instance, clearly expressed this view:

> ... *learning strategies* are viewed as learning processes which are consciously selected by the learner. The element of *choice* is important here because this is what gives a strategy its special character. These are also moves which the learner is at least partially aware of, even if full attention is not being given to them. For example, a learner may use the strategy of skimming a portion of text in order to avoid a lengthy illustration. If a learner's move is totally unconscious, then it would simply be referred to as a "process," and not a "strategy." (COHEN 1990:5)

It may well be that it is the difficulty in establishing this level of awareness to which Cohen refers that prevents researchers from taking a position. As was shown by SCHMIDT (1990), different meanings can be attributed to the term. MCLAUGHLIN (1990) suggests that the other alternative to the treatment of this key issue in LSs studies is to refer to terms that are more specific than the term *consciousness* (or not so charged with meaning as *consciousness* is) and define it as explicitly as possible (McLaughlin chooses to work with the controlled/automatic contrast).

However difficult it may be to deal with the notion of consciousness, it is not possible to carry out a theoretical discussion of language learning strategies without some understanding of the different levels of consciousness that can be involved in the learning process.[10] This should be especially expected from a field in TL studies which since its beginnings has developed on the basis of learners' reports about what was consciously going through their minds.

In fact, besides the learning and the strategic aspects treated in this work, this *availability for verbal reports* has come out as a third aspect in the discussion about the definition of LSs (*see* Chapter 4, section 4.4). As O'MALLEY and CHAMOT (1990:3) observed, the initial concern with the identification of the characteristics of 'good language learners' led to research based on students' reports and observation of language learning situations. RUBIN's (1975) and Naiman's (NAIMAN et al. 1978) first experiments showed that classroom observations were very little productive in LS research. Instead, they found it more productive to rely on data provided by verbal reports, and since when various techniques (e.g. oral and written interviews, guided or open questionnaires, journals) have been used to collect data about LSs.

The question raised is whether a research methodology based on the use of verbal reports may present constraints which can influence what is understood by LLSs. For instance, learners may be aware of a given process but be unable to give a corresponding verbal report, or they may not remember something due to the demand on short-term memory imposed by a complex task or to the time elapsed

[10] It is difficult to accept, for instance, that in a book theoretically focusing on language learning strategies, such as O'MALLEY and CHAMOT's (1990:81-82), a section under the heading 'conscious awareness', while referring to the use of the concept in cognitive studies (SHIFFRIN AND SCHNEIDER 1984; ANDERSON 1985), does not present any statement linking consciousness with strategic processes.

between the experiment and the elicitation of a verbal report.[11] Practical methodological constraints such as these determine the kind of data based on which theoretical discussions about LLSs are carried out.

This work has focused mainly on the first two aspects, the learning and the strategic/conscious aspects, and essentially concluded that learning strategies are conscious learning processes, not a separate set of special or auxiliary processes. However, it has also shown that LS studies in the TL field have developed owing to the possibility of using specific research techniques to get the necessary data (the use of verbal reports to collect information about the learners' mental processes). This methodological aspect can be as important for the definition of LLSs as the theoretical models utilised to explain them. Thus there are actually three key aspects to define the use of the term *language learning strategy*: the *learning* aspect, the *strategic* or *conscious* aspect and the *availability for verbal report*.

In the next section there is a discussion concerning the last aspect, the availability for reports, which has not been treated extensively in this work. It is intended as an outline of a research question raised by the present study and which deserves further attention.

## 5.2 LLS studies and the use of verbal reports: an outline for further research

As mentioned above, conventional classroom observation was used in the early experiments on LLSs, but the conclusion was soon reached that it was difficult to obtain information or insights about learners' conscious mental processes in this way (NAIMAN et al 1975, RUBIN 1975). In Rubin's study, for example, the most productive methods to identify LSs were the analysis of learners' self-reports (they were asked to write down what they did to learn a second language) and the analysis of learners' journals. Not satisfied with the few LSs that could be observed in the classroom, Naiman and his colleagues resorted to interviews with learners. This was the beginning of 'a new focus in research on strategies: the collection of learners' reports of their own insights about the strategies they use' (COHEN 1987:32).

[11] SCHMIDT (1990:132), for example, when discussing awareness and availability for verbal report, warns about the importance of the use of adequate techniques (e.g., concurrent reports), but also notes that there are conscious experiences which are inherently difficult to describe.

As Cohen explains, verbal reports are not simply one method of research, but rather refer to various techniques of data collection about cognitive processes (COHEN 1994:679). They may be obtained concurrently with a task being studied or in retrospection, they may be think-aloud reports, or general self-reports (written or oral). Until recently, especially during the heyday of behaviourism, they were regarded with suspicion in relation to the validity of the data they provided. As ERICSSON and SIMON (1980:216) pointed out, all sorts of verbal data were 'frequently dismissed as [the result of] variants of the discredited process of introspection (NISBETT and WILSON 1977)'. However, with the renewed interest in mentalistic approaches, the different techniques involved in obtaining verbal data received a new status:

> Introspection gives us information about experience. It yields data otherwise inaccessible. It may besides bring to light facts that might otherwise be overlooked, or stimulate us to ask new questions. Like any technique, it has peculiar difficulties, especially when used in odd circumstances. (Radford and Burton 1974:395)

The need to rely again on the use of verbal reports because of the unique nature of the data obtained from them led to the specification and critical analysis of the difficulties and circumstances involved in the task (such as the studies carried out by SMITH and MILLER 1978 and ERICSSON and Simons 1980). Researchers, including those in the area of TL and LS studies, became more aware of the uses and limitations of the techniques, overcoming the weaknesses of early studies (O'MALLEY and CHAMOT 1990:96-97; COHEN 1987:35-37; COHEN 1994:678-82).

According to COHEN (1987:32-33), the techniques most commonly used to tap language learning processes can be summarised in three categories:

a. *self-reports*, in which learners describe what they do, characteristically using generalised statements about their learning behaviour;

b. *self-observation*, in which specific language behaviour is checked (either while the information is available in short-term memory or after the event;

c. *self-revelation*, or what is usually referred to as the 'think-aloud' technique, in which the learner's thoughts are verbalised in a stream-of-consciousness fashion while the information is being attended to.

He adds that the type of data obtained from these three categories is dependent on six major factors: the number of participants (investigators and

respondents), the research context (when and where the data collection takes place), the recency of the event (the time elapsed between the actual learning event and the verbal report), the mode of elicitation of response (oral or written responses, videotaped recordings), the formality of elicitation (degree of formal structure, e.g. a set of fixed questions or a flexible questioning format) and the degree of external intervention (the higher or lower influence of the investigator's instructions in the respondent's reporting process). He provides a table, presented below, showing tentatively which variables 'tend to apply to particular types of data, or the extent to which [they] apply' (COHEN 1987:35).

The appropriate choice of verbal data and an awareness of the factors that may influence the verbal report do not eliminate all the difficulties in utilising this methodological tool, but they ensure higher quality and reliability for the resulting data. With this approach, for instance, researchers avoid assuming that any type of verbal report gives the same kind of data or that it reflects mental processes in the same way.

Table 5.1 Types of data and their descriptors (COHEN 1987:34)

| **Type of data** | **Descriptors** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # Participants | | | Context | | Recency | Mode | | | | Formality | Degree of external intervention |
| | Gp. | Indiv. +Invest. | Indiv. Alone | Dur. Class | Other | | Elic. O | Elic. W | Resp. O | Resp. W | | |
| Self-Report | X | X | X | | X | LO-HI | X | X | X | X | LO-HI | LO-HI |
| Self-observation: | | | | | | | | | | | | |
| introspection | X | X | X | X | X | HI | X | X | X | X | LO | LO-MED |
| retrospection | X | X | X | X | X | LO-MED | X | X | X | X | LO-MED | LO-MED |
| Self-Revealment: | | | | | | | | | | | | |
| think aloud | | X | | | X | HI | X | | X | | LO | LO |

ERICSSON and SIMON (1980), who were seriously concerned with this issue, considered, among others, the following forms of probing, involving the recency of the event and the effects of instruction: the *think-aloud procedure*, *concurrent verbalisation for specific probe* and *retrospective verbalisation*. In the *think-aloud procedure* the information or processes attended to may be verbalised 'either through

direct articulation or by verbal encoding of information that was originally stored in a nonverbal code'; thus 'a direct trace is obtained of the heeded information, and hence, an indirect one of the internal stages of the cognitive process' (ERICSSON and SIMON 1980:220). In the second form of probing, although the *concurrent verbalisation* guarantees a better access to the contents of short-term memory, the *specificity of the information* being probed may present some difficulties:

> Probes for types of information that subjects do not have directly accessible [e.g., information about or dependent on unconscious processes], or probes that provide inadequate sets of alternatives, may force subjects to intermediate and inferential processing, and hence produce verbal reports that are not closely related to the actual thought process. [...]
>
> Finally, different kinds of probes may have different effects on the subsequent behaviour of subjects. The request for a certain type of information may serve as a hint to subjects about what aspects of the task are important. Subjects may also alter their normal mode of processing in order to be able to give the requested information on subsequent trials. (ERICSSON and SIMON 1980:222)

The problem involving the last form of probing (when subjects are probed after the completion of a task, that is, in retrospection) is that the resulting data 'cannot be relied on [as] stemming directly from the subjects' actual sequences of thought processes' (ERICSSON and SIMON 1980:221). In fact, this procedure frequently leads subjects to infer and generalise about their processes. Indeed, in some studies (NISBETT and WILSON 1977) subjects are even asked about hypothetical situations (such as how they would behave if the experiment were altered in this or that way). Retrospective verbalisation may be useful for assessing learners' beliefs, for instance, but is not the most suitable tool for assessing mental processes actually used by learners.

As ERICSSON and SIMON (1980:222-23) suggest, a cognitive processing model may help researchers 'in interpreting the verbal data obtained from subjects and the relation of their verbal to their other behavior'. In their article, they rely on a simple and general model to deal with questions concerning the validity of verbal data. A cognitive process is defined as 'a sequence of internal states successively transformed by a series of information processes' (223). Besides the sensory stores of short duration responsible for perception processes, they refer to short-term memory (with limited storage capacity) and long-term memory ('with large capacity

and relatively permanent storage, but with slow fixation and access times compared with the other memories'). According to this framework, they explain that

> … it is assumed that information recently acquired (attended to) by the central processor is kept in STM and is directly accessible for further processing (e.g., for producing verbal reports), whereas information from LTM must be first retrieved (transferred to STM) before it can be reported.
>
> [...] The important hypothesis for us is that due to the limited capacity of STM, only the most recently heeded information is accessible directly. However, a portion of the contents of STM is fixated in LTM before being lost from STM, and this portion can, at later points in time, sometimes be retrieved from LTM.
>
> We assume that any verbalization or verbal report of the cognitive process would have to be based on a subset of the information in these memories. (ERICSSON and SIMON 1980:223)

After developing some more aspects of STM and LTM and key processes like fixation, automation and control of attention, they are able to make predictions about the kind of information that verbalisation processes may produce and, finally, analyse the predictions against previous studies involving the use of verbal reports as data.

To the question raised concerning language learning strategies, that is, if the very research methods employed to identify them may limit or define what is understood by the term, predictions about the kinds of incompleteness that could be found in verbal reports may be a starting point for further discussion. ERICSSON and SIMON (1980:236) identified three causes of incompleteness according to their general processing model:

> (a) The information is not heeded, hence not stored in STM, hence not accessible for verbal reporting. (b) Not all the information available in STM at the time of the report is actually reported. (c) Not all of the information previously available in STM has been retained in LTM, or is retrievable from LTM.

Some of the processes that are used in their article to explain the identification of these causes have already been mentioned in this work in the presentation of Anderson's model. The first cause, for example, has to do with the automatization of overlearned processes; the second cause is related to conditions in which there is a high cognitive processing load, among other factors; the third aspect involves the fallibility of LTM retrieval and the triggering of interconnected processes and information in LTM.

By developing a theoretical framework like this and exploring the predictions it may supply, it would be possible to review and analyse the experiments on learning strategies carried out in the field of TL acquisition. This analysis involving the comparison of the different kinds of verbal reports and other research methods utilised would help answer questions about the nature of LLSs while at the same time creating a rationale for LS research methodology (with increased validation of the data thus supplied).

# APPENDIXES

## CLASSIFICATIONS OF LEARNING STRATEGIES

1. Two early classifications of learning strategies in second language acquisition (O'MALLEY and CHAMOT 1990:4-5).

| Author | Primary strategy classification | Representative secondary strategies | Representative examples |
|---|---|---|---|
| Rubin (1981) | Strategies that directly affect learning | Clarification/verification | Asks for an example of how to use a word or expression |
| | | | Repeats words to confirm understanding |
| | | Monitoring | Corrects errors in own/other's pronunciation, vocabulary, spelling, grammar, style |
| | | Memorization | Takes notes of new items, pronounces out loud, finds a mnemonic, writes item repeatedly |
| | | Guessing/inductive inferencing | Guesses meanings from key words, structures, pictures, context, etc. |
| | | Deductive reasoning | Compares native/other language to target language |
| | | | Groups words |
| | | Practice | Experiments with new sounds |
| | | | Repeats sentences until pronounced easily |
| | Processes that contribute indirectly to learning | Creates opportunities for practice | Creates situation with native speakers |
| | | | Initiates conversation with fellow students |
| | | | Spends time in language lab, listening to TV, etc. |
| | | Production tricks | Uses circumlocutions, synonyms, or cognates |
| | | | Uses formulaic interaction |
| | | | Contextualizes to clarify meaning |

| | | | |
|---|---|---|---|
| Naiman et al. (1978) | Active task approach | Responds positively to learning opportunity or seeks and exploits learning environments | Students acknowledges need for a structured learning environment and takes a course prior to immersing him/herself in target language |
| | | Adds related language learning activities to regular program | Reads additional items<br>Listens to tapes |
| | | Practices | Writes down words to memorize<br>Looks at speaker's mouth and repeats |
| | | Analyzes individual problems | Reads alone to hear sounds |
| | Realization of language as a system | Makes L1/L2 comparisons | Uses cognates<br>Using what is already known |
| | | Analyzes target language to make inferences | Uses rules to generate possibilities |
| | | Makes use of fact that language is a system | Relates new dictionary words to others in same category |
| | Realization of language as a means communication and interaction | Emphasizes fluency over accuracy | Does not hesitate to speak<br>Uses circumlocutions |
| | | Seeks communicative situations with L2 speakers | Communicates whenever possible<br>Establishes close personal contact with L2 speakers<br>Writes to pen pals |
| | | Finds sociocultural meanings | Memorizes courtesies and phrases |
| | Management of affective demands | Copes with affective demands in learning | Overcomes inhibition to speak<br>Is able to laugh at own mistakes<br>Is prepared for difficulties |
| | Monitoring L2 performance | Constantly revises L2 system by testing inferences and asking L2 native speakers for feedback | Generates sentences and looks for reactions<br>Looks for ways to improve so as not to repeat mistakes |

2. O'MALLEY and CHAMOT (1987:47) presented a list of learning strategies applied to second language learning.

PRELIMINARY CLASSIFICATION OF LEARNING STRATEGIES

| Generic strategy classification | Representative strategies | Definitions |
|---|---|---|
| Metacognitive strategies | Selective attention | Focusing on special aspects of learning tasks, as in planning to listen for key words or phrases. |
| | Planning | Planning for the organization of either written or spoken discourse. |
| | Monitoring | Reviewing attention to a task, comprehension of information that should be remembered, or production while it is occurring. |
| | Evaluation | Checking comprehension after completion of a receptive language activity, or evaluating language production after it has taken place. |
| Cognitive Strategies | Rehearsal | Repeating the names of items or objects to be remembered. |
| | Organization | Grouping and classifying words, terminology, or concepts according to their semantic or syntactic attributes. |
| | Inferencing | Using information in text to guess meanings of new linguistic items, predict outcomes, or complete missing parts. |
| | Summarizing | Intermittently synthesinzing what one has heard to ensure the information has been retained. |
| | Deducing | Applying rules to the understanding of language. |
| | Imagery | Using visual images (either generated or actual) to understand and remember new verbal information. |
| | Transfer | Using known linguistic information to facilitate a new learning task. |
| | Elaboration | Linking ideas contained in new information, or integrating new ideas with known information. |
| Social/affective Strategies | Cooperation | Working with peers to solve a problem, pool information, check notes, or get feedback on a learning activity. |
| | Questioning for clarification | Eliciting from a teacher or peer additional explanation, rephrasing, or examples. |
| | Self-talk | Using mental redirection of thinking to assure oneself that a learning activity will be successful or to reduce anxiety about a task. |

3. Language learning strategies mentioned by COHEN (1990:15).

| | Language skills | | | |
|---|---|---|---|---|
| Learning strategies | Vocabulary learning | Conversational discourse | Reading | Writing |
| | | Aural Oral | | |
| Recall strategies | X | | | |
| Attending strategies | | X | | |
| Synthesizing strategies | | X | | |
| Self-awareness and monitoring strategies | | | X | |
| Modeling and feedback | | | | X |

1. Strategies for remembering words
   a. using mnemonic associations

2. Vocabulary learning strategies
   a. word analysis
   b. the learning of cognates
   c. using a dictionary

3. Strategies for practicing words
   a. the use of flash cards
   b. grouping
   c. cumulative vocabulary study

4. Communication strategies

4.1. strategies based on the native language
   a. borrowing
   b. literal translation
   c. foreignizing

4.2. strategies based on the target language
   a. use of a general word
   b. approximation
   c. description
   d. word coinage
   e. mime
   f. appeal for assistance
   g. word abandonment

4.3. discourse planning strategies
   a. avoidance
   b. topic avoidance

5. Reading strategies
   a. clarification of purpose
   b. organization of text
   c. reading for meaning
   d. focusing on major content
   e. parsimonious use of a dictionary
   f. judicious use of context
   g. reading in broad phrases
   h. ongoing summaries
   i. making predictions
   j. looking for markers of cohesion
   k. strategies for dealing with strategies: metacognitive strategies: planning, monitoring assessing

6. Writing strategies
   a. going back to go forward
   b. repeating key words or phrases
   c. using advanced or emerging planning (or both)
   d. postponing major revision until the ideas are written down
   e. making decisions by assessing different aspects of writing in conjunction
   f. searching extensively for the "right words"
   g. distancing self from text
   h. keeping in mind the goals and the audience
   i. writing multiple drafts

4. COHEN (1990:91) used the classification of reading strategies proposed by SARIG (1985):

1. Support strategies - types of reading acts undertaken to facilitate high-level strategies - for example, skimming, scanning, skipping, marking the text, and using a glossary.
2. Paraphrase strategies - decoding strategies to clarify meaning by simplifying syntax, finding synonyms for words and phrases, looking for propositions or basic ideas, and identifying the function of portions of the text.
3. Strategies for establishing coherence in text - the use of word knowledge or clues in the text to make the text intelligible as a piece of connected discourse - for example, looking for organization, using context, and distinguishing the discourse functions in the text (such as introduction, definition, exemplification, and conclusion).
4. Strategies for supervising strategy use[10] - conscious strategies for checking on the reading process as it takes place - for example, planning ongoing self-evaluation, changing the planning and executing of tasks, identifying misunderstandings, and remediating when reading problems are found.

[10]The translation of these four types of strategies actually appeared as techninal-aid moves, clarification and simplification moves, coherence-detecting moves, and monitoring moves (Sarig 1987).

5. Classification and definitions of learning strategies taken from a study by O'MALLEY and CHAMOT about the use of learning strategies by beginning and intermediate ESL students (1990:119-20).

ESL DESCRIPTIVE STUDY: LEARNING STRATEGY DEFINITIONS AND CLASSIFICATIONS

| Learning strategy | Definition |
|---|---|
| A. Metacognitive Strategies | |
| *Planning* | |
| Advance organizers | Previewing the main ideas and concepts of the material to be learned, often by skimming the text for the organizing principle. |
| Directed attention | Deciding in advance to attend in general to a learning task and to ignore irrelevant distractors. |
| Functional planning | Planning and rehearsing linguistic components necessary to carry out an upcoming language task. |
| Selective attention | Deciding in advance to attend to specific aspects of input, often by scanning for key words, concepts, and/or linguistic markers. |
| Self-management | Understanding the conditions that help one learn and arranging for the presence of those conditions. |
| *Monitoring* | |
| Self-monitoring | Checking one's comprehension during listening or reading or checking the accuracy and/or appropriateness of one's oral or written production while it is taking place. |
| *Evaluation* | |
| Self-evaluation | Checking the outcomes of one's own language learning against a standard after it has been completed. |

B. Cognitive strategies

| | |
|---|---|
| Resourcing | Using target language reference materials such as dictionaries, encyclopedias, or textbooks. |
| Repetition | Imitating a language model, including overt practice and silent rehearsal. |
| Grouping | Classifying words, terminology, or concepts according to their attributes or meaning. |
| Deduction | Applying rules to understand or produce the second language or making up rules based on language analysis. |
| Imagery | Using visual images (either mental or actual) to understand or remember new information. |
| Auditory representation | Planning back in one's mind the sound of a word, phrase, or longer language sequence. |
| Keyword method | Remembering a new word in the second language by: (1) identifying a familiar word in the first language that sounds like or otherwise resembles the new word, and (2) generating easily recalled images of some relationship with the first language homonym and the new word in the second language. |
| Elaboration | Relating new information to prior knowledge, relating different parts of new information to each other, or making meaningful personal associations with the new information. |
| Transfer | Using previous linguistic knowledge or prior skills to assist comprehension or production. |
| Inferencing | Using available information to guess meanings of new items, predict outcomes, or fill in missing information. |
| Note taking | Writing down key words or concepts in abbreviated verbal, graphic, or numerical form while listening or reading. |
| Summarizing | Making a mental, oral, or written summary of new information gained through listening or reading. |
| Recombination | Constructing a meaningful sentence or larger language sequence by combining known elements in a new way. |
| Translation | Using the first language as a base for understanding and/or producing the second language. |

C. Social mediation

| | |
|---|---|
| Question for clarification | Eliciting from a teacher or peer additional explanations, rephrasing, examples, or verification. |
| Cooperation | Working together with one or more peers to solve a problem, pool information, check a learning task, model a language activity, or get feedback on oral or written performance. |

Source: Adapted from O'Malley, Chamot, Stewner-Manzanares, Küpper, and Russo (1985)

6. The following list of strategies presents definitions proposed by CHAMOT (1987, p.77):

| Learning Strategy | Description |
|---|---|
| *Metacognitive* | |
| Advance Organizers | Making a general but comprehensive preview of the concept or principle in an anticipated learning activity. |
| Directed Attention | Deciding in advance to attend in general to a learning task and to ignore irrelevant distractors. |
| Selective Attention | Deciding in advance to attend to specific aspects of language input. |
| Self-management | Understanding the conditions that help one learn and arranging for the presence of those conditions. |
| Advance Preparation | Planning for and rehearsing linguistic components necessary to carry out an upcoming language task. |
| Self-monitoring | Correcting one's speech for accuracy in pronunciation, grammar, vocabulary, or for appropriateness related to the setting or to the people who are present. |
| Delayed Production | Consciously deciding to postpone speaking to learn initially through listening comprehension. |
| Self-evaluation | Checking the outcomes of one's own language learning against an internal measure of completeness and accuracy. |
| *Cognitive* | |
| Repetition | Imitating a language model, including overt practice and silent rehearsal. |
| Resourcing | Defining or expanding a definition of a word or concept through use of target language reference materials. |
| Directed Physical Response | Relating new information to physical actions, as with directives. |
| Translation | Using the first language as a base for understanding and/or producing the second language. |
| Grouping | Reordering or reclassifying and perhaps labelling the material to be learned based on common attributes. |
| Note-taking | Writing down the main idea, important points, outline, or summary of information presented orally or in writing. |
| Deduction | Consciously applying rules to produce or understand the second language. |
| Recombination | Constructing a meaningful sentence or larger language sequence by combining known element in a new way. |
| Imagery | Relating new information to visual concepts in memory via familiar easily retrievable visualizations, phrases, or locations. |
| Auditory Representation | Retention of the sound or similar sound for a word, phrase, or longer language sequence. |
| Key Word | Remembering a new word in the second language by (1) identifying a familiar word in the first language that sounds like or otherwise resembles the new word, and (2) generating easily recalled images of some relationship between the new word. |
| Contextualization | Placing a word or phrase in a meaningful language sequence. |
| Elaboration | Relating new information to other concepts in memory. |
| Transfer | Using available information to guess meanings of new items, predict outcomes, or fill in missing information. |
| *Social-affective* | |
| Cooperation | Working with one or more peers to obtain feedback, pool information, or model a language activity. |
| Question for Clarification | Asking a teacher or other native speaker for repetition, paraphrasing, explanation and/or examples. |

7. CHAMOT and O'MALLEY (1994:62-63) presented the following list of general learning stratregies.

**Table 4.1**
**LEARNING STRATEGIES IN THE CLASSROOM**

**Metacognitive Strategies**

| STRATEGY NAME | STRATEGY DESCRIPTION | STRATEGY DEFINITION |
|---|---|---|
| **Planning** | | |
| Advance Organization | Preview<br>Skim<br>Gist | Previewing the main ideas and concepts of a text; identifying the organizing principles |
| Organizational Planning | Plan what to do | Planning how to accomplish the learning task; planning the parts and sequence of ideas to express. |
| Selective attention | Listen or read selectively<br>Scan<br>Find specific information | Attending to key words, phrases, ideas, linguistic markers, types of information. |
| Self-management | Plan when, where, and how to study | Seeking or arranging the conditions that help to learn |
| **Monitoring** | | |
| Monitoring Comprehension | Think while listening<br>Think while reading | Checking one's comprehension during listening or reading |
| Monitoring Production | Think while speaking<br>Think while writing | Checking one's oral or written production while it is taking place. |
| **Evaluating** | | |
| Self-assessment | Check back<br>Keep a learning log<br>Reflect on what you learned | Judging how well one has accomplished a learning task |

**Cognitive Strategies**

| STRATEGY NAME | STRATEGY DESCRIPTION | STRATEGY DEFINITION |
|---|---|---|
| Resourcing | Use reference materials | Using reference materials such as dictionaries, encyclopedias, or textbooks. |
| Grouping | Classify<br>Construct graphic organizers | Classifying words, terminology, quantities, or concepts according to their attributes. |
| Note-taking | Take notes on idea maps, T-lists, etc. | Writing down key words and Concepts in abbreviated verbal, graphich or numerical form. |
| Elaboration of Prior Knowledge | Use what you know<br>Use background knowledge<br>Make analogies | Relating new to known information and making personal associations |
| Summarizing | Say or write the main idea | Making a mental, oral, or written summary of information gained from listening or reading |
| Deduction/Induction | Use a rule/Make a rule | Applying or figuring out rule to understand a concept or complete a learning task. |
| Imagery | Visualize<br>Make a picture | Using mental or real pictures to learn new information or solve a problem. |
| Auditory Representation | Use your mental tape recorder<br>Hear it again | Replaying mentally a word, phrase, or piece of information. |
| Making inferences | Use context clues<br>Guess from the text<br>Predict | Using information in the text to guess meanings of new items or predict upcoming information. |

**Social / Affective Strategies**

| STRATEGY NAME | STRATEGY DESCRIPTION | STRATEGY DEFINITION |
|---|---|---|
| Questioning for Clarification | Ask questions | Getting additional explanation or verification from a teacher or other expert. |
| Cooperation | Cooperate<br>Work with classmates<br>Coach each other | Working with peers to complete a task, solve a problem, get feedback. |
| Self-Talk | Think positive! | Reducing anxiety by improving one's sense of competence. |

8. OXFORD (1990:16-21) proposed the following classification of language learning strategies:

| | | | |
|---|---|---|---|
| Direct strategies | memory strategies | creating mental linkages | grouping<br>associating/elaborating<br>placing new words into a context |
| | | applying images and sounds | using imagery<br>semantic mapping<br>using keywords<br>representing sounds in memory |
| | | reviewing well | structured reviewing |
| | | employing action | using physical response or sensation<br>using mechanical techniques<br>repeating |
| | | practising | formally practicing with sounds and writing systems |
| | cognitive strategies | | recognizing and using formulas and patterns<br>recombining<br>practicing naturalistically |
| | | receiving and sending messages | getting the idea quickly<br>using resources for receiving and sending messages |
| | | analyzing and reasoning | reasoning deductively<br>analyzing expressions<br>analyzing contrastively (across languages)<br>translating<br>transferring |
| | | creating structure for input and output | taking notes<br>summarizing<br>highlighting |
| | | guessing intelligently | using linguistic clues<br>using other clues |
| | | overcoming limitations in speaking and writing | switching to the mother tongue<br>getting help<br>using mime or gesture<br>avoiding communication partially or totally<br>selecting the topic<br>adjusting or approximating the message<br>coining words<br>using a circumlocution or synonym |
| | compensation strategies | | |

| | | | |
|---|---|---|---|
| Indirect strategies | metacognitive strategies | centering your learning | overviewing and linking with already known material<br>paying attention<br>delaying speech production to focus on listening |
| | | arranging and planning your learning | finding out about language learning<br>organizing<br>setting goals and objectives<br>identifying the purpose of a language task (purposefully listening/ reading/speaking/writing)<br>planning for a language task<br>seeking practice opportunities |
| | | evaluating your learning | self-monitoring<br>self-evaluating |
| | affective strategies | lowering your anxiety | using progressive relaxation, deep breathing, meditation<br>using music<br>using laughter |
| | | encouraging yourself | making positive statements<br>taking risks wisely<br>rewarding yourself |
| | | taking your emotional temperature | listening to your body<br>using a checklist<br>writing a language learning diary<br>discussing your feelings with someone else |
| | social strategies | asking questions | asking for clarification or verification |
| | | cooperating with others | cooperating with peers<br>cooperating with proficient users of the new language |
| | | empathizing with others | developing cultural understanding<br>becoming aware of other's thoughts and feelings |

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